THE PAPER INDUSTRY and PAPER WORLD

AN EDUCATIONAL NEWS MAGAZINE — MAY, 1943

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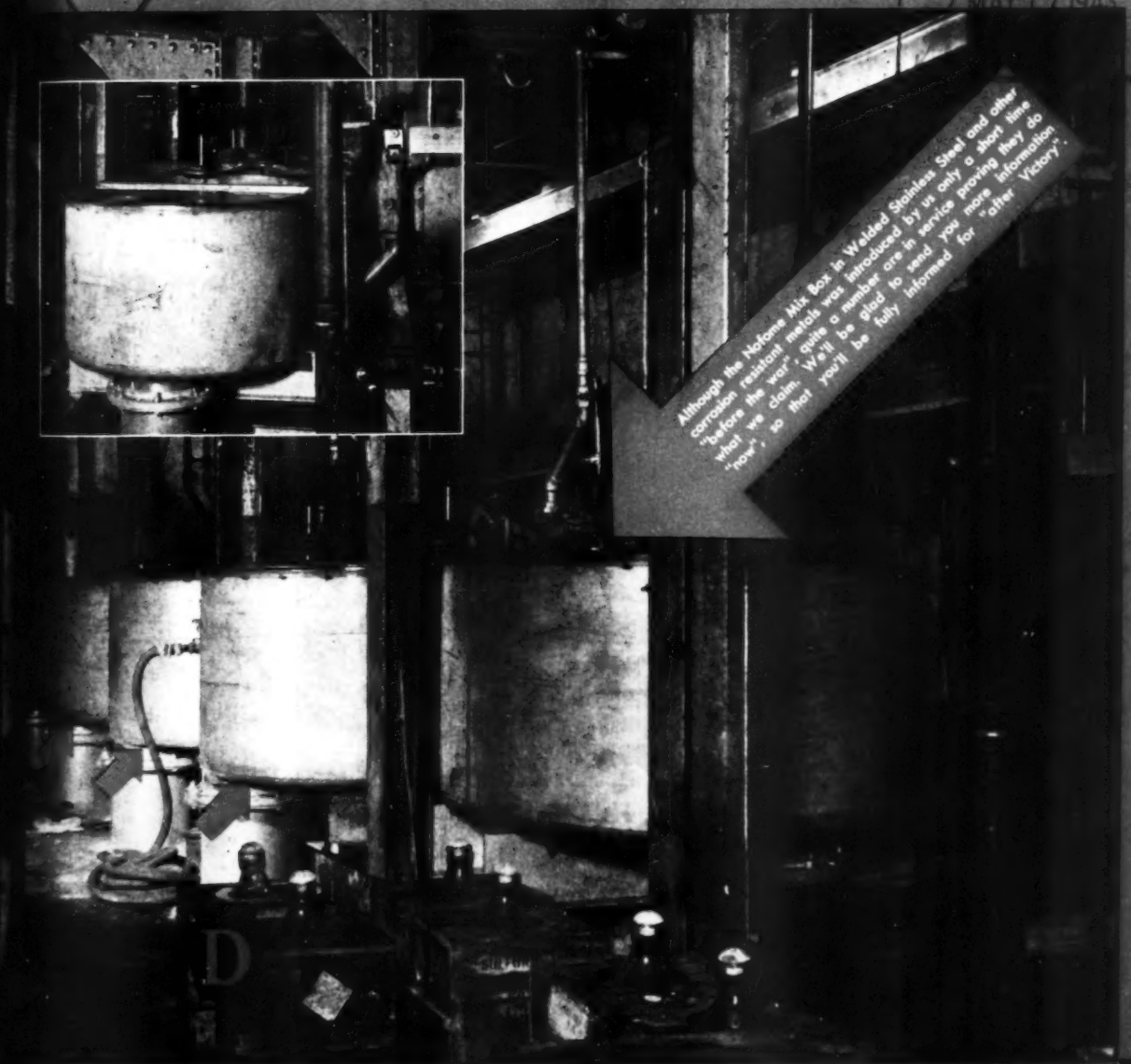
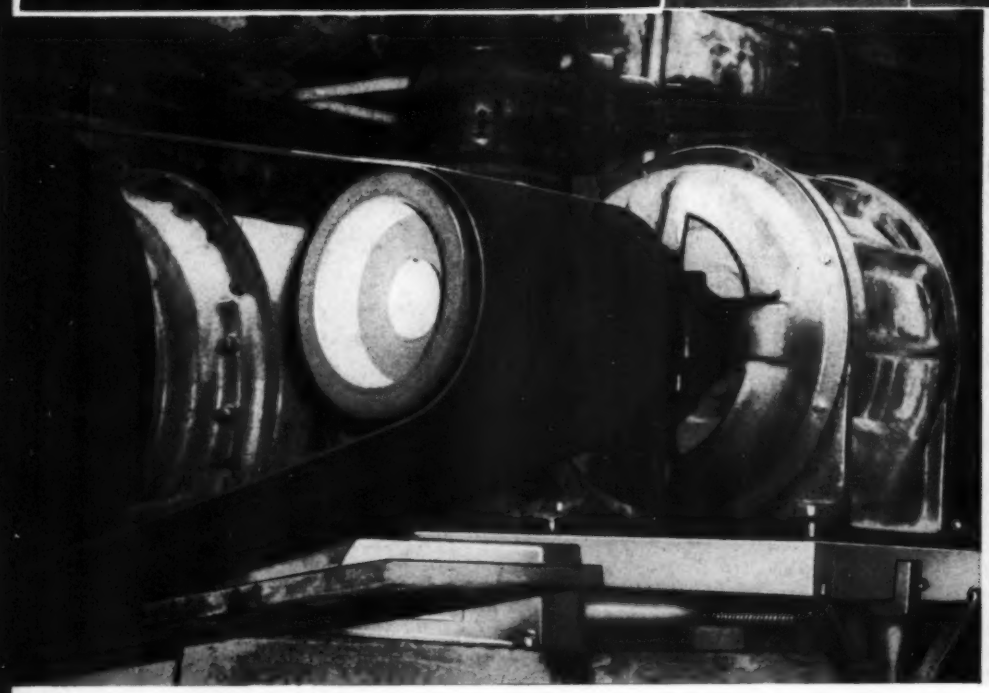

Although the No-Tome Mix Box is Welded Stainless Steel and other corrosion resistant metals was introduced by us only a short time "before the war", quite a number are in service proving they do what we claim. We'll be glad to send you more information "now", so that you'll be fully informed for "after Victory".
DOWNINGTOWN MFG. CO., DOWNINGTOWN, PA.

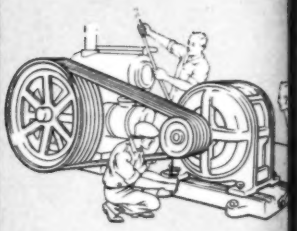
ST. HELENS PULP & PAPER COMPANY, ST. HELENS, WASHINGTON

This modern progressive company has a pulp and paper mill with 18 beaters and two big paper machines. They first put in one Rockwood Drive, then another, then some more until they now have about 30 of them.

Upper picture at right is 60 hp. wound rotor motor driving winder of No. 1 machine through a countershaft. Frequent stops and starts characterize the drive. Picture below is 100 hp. Nash vacuum pump drive located directly under wire pit of the machine.

ROCKWOOD *automatic belt tightening* MOTOR BASES





DO AWAY WITH THIS

Costly shut downs for manual be tightening are a thing of the pa —too wasteful of time and labo Thanks to the Rockwood pivote motor base belt tightening is no made automatic. Belts that stret are automatically re-tightened— and neither too tight nor too loo —but just right to suit the vary load. Considered the biggest i provement ever developed f electric motor belt drives. For u with either V-belts or flat belts.

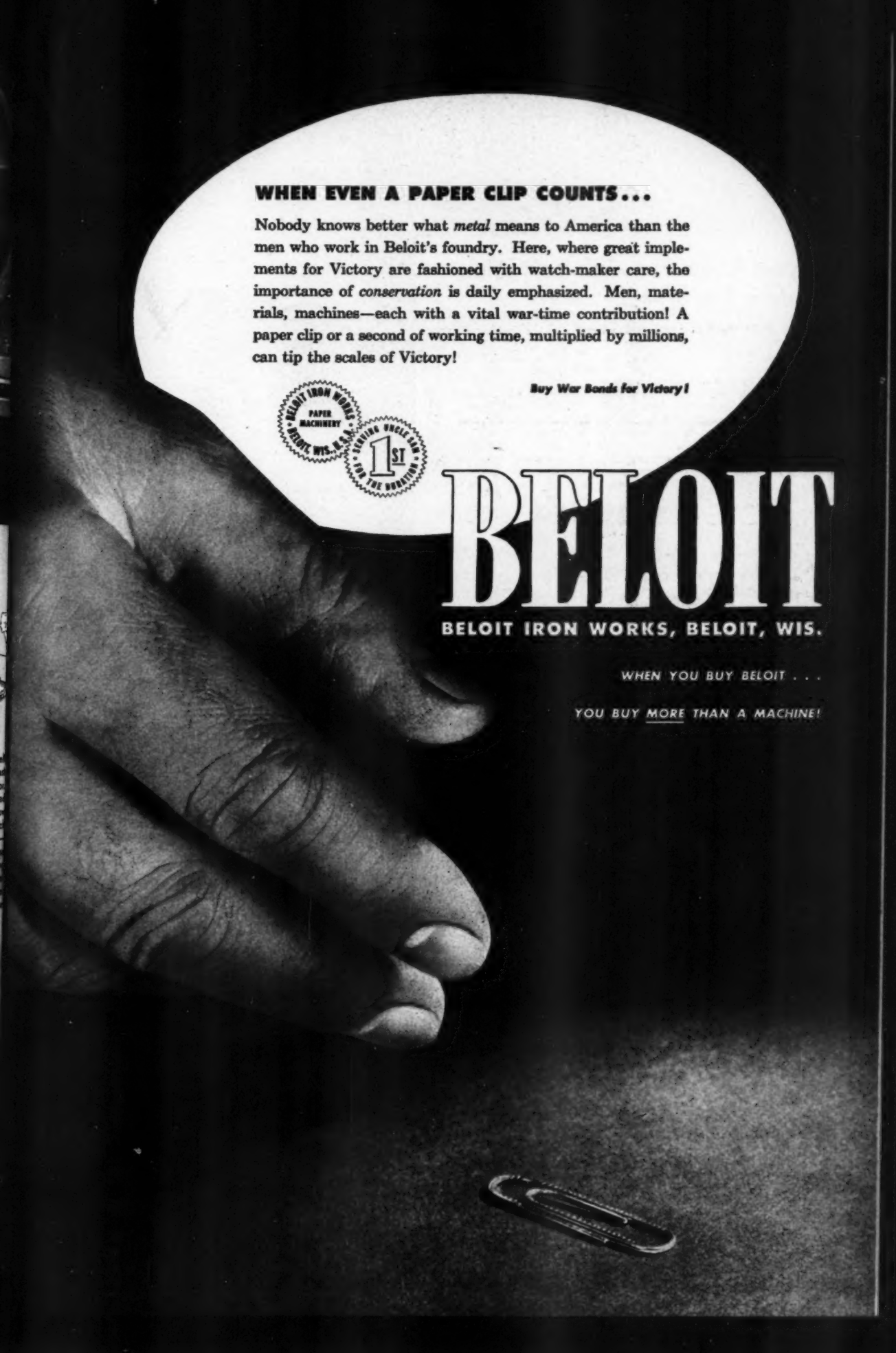
Another Leading Paper Mill Installs Rockwood Pivoted Motor Drives

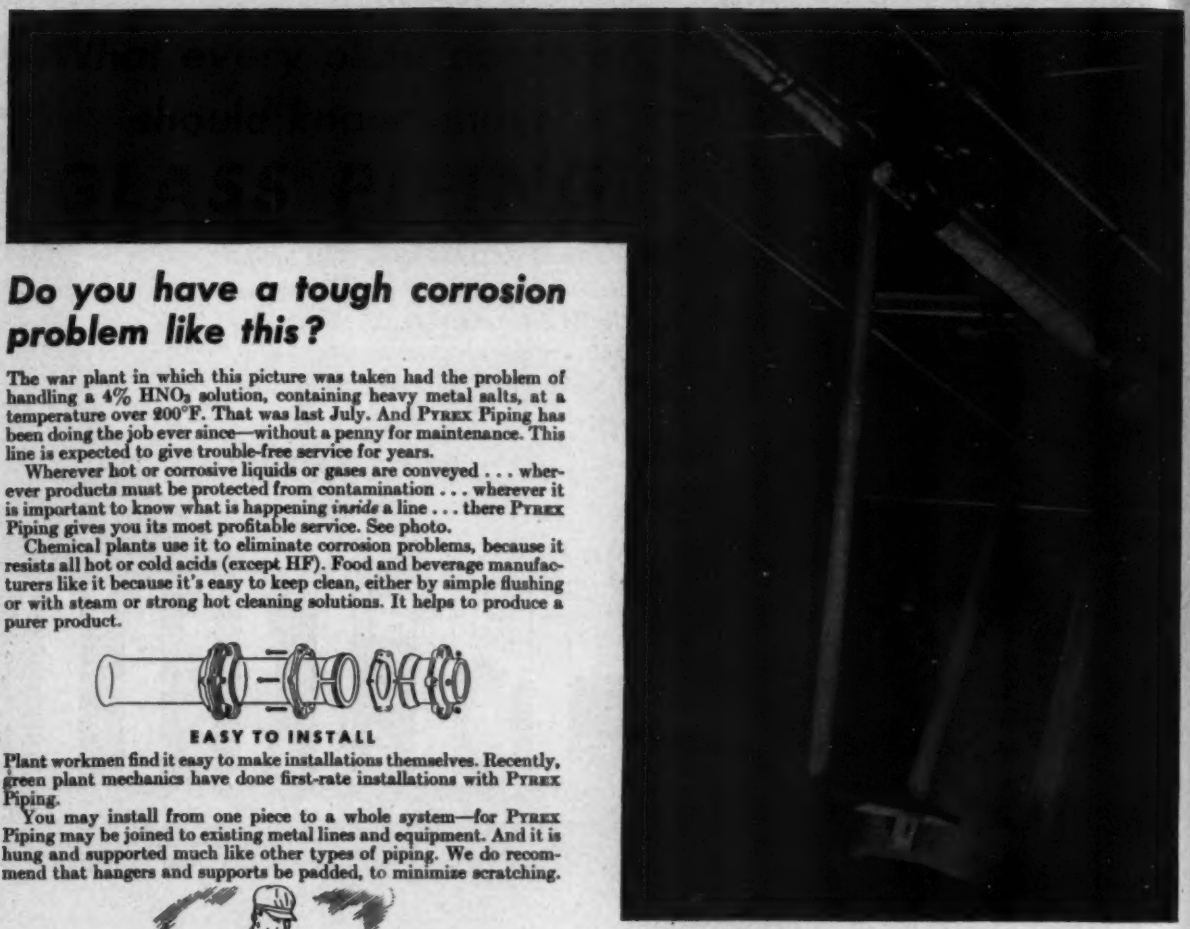
In almost every paper mill where one or more Rockwood Drives are first installed on trial and plant engineers then take time to carefully check results, the automatic belt tightening motor base soon becomes accepted mill practice.

When mill engineers see how simply the Rockwood pivoted motor Drive takes up belt stretch and how the belt tightness automatically matches each load change it is obvious why the driven machine operates better and at more dependable speeds.

Belt life—V-belt or flat—is increased —ordinarily doubled. Never before has a belt drive from electric motor to driven machine been so soundly engineered. One reason why so many paper mill engineers are installing them. WRITE ABOUT YOUR DRIVES TODAY.

ROCKWOOD MANUFACTURING CO., INDIANAPOLIS, IN


WHEN EVEN A PAPER CLIP COUNTS...
Nobody knows better what *metal* means to America than the men who work in Beloit's foundry. Here, where great implements for Victory are fashioned with watch-maker care, the importance of *conservation* is daily emphasized. Men, materials, machines—each with a vital war-time contribution! A paper clip or a second of working time, multiplied by millions, can tip the scales of Victory!
Buy War Bonds for Victory!
BELOIT IRON WORKS PAPER MACHINERY BELOIT WIS. U.S.A.
SERVING UNCLE SAM 1ST FOR THE DURATION
BELOIT
BELOIT IRON WORKS, BELOIT, WIS.
WHEN YOU BUY BELOIT . . .
YOU BUY MORE THAN A MACHINE!



Do you have a tough corrosion problem like this?

The war plant in which this picture was taken had the problem of handling a 4% HNO_3 solution, containing heavy metal salts, at a temperature over 200°F. That was last July. And PYREX Piping has been doing the job ever since—without a penny for maintenance. This line is expected to give trouble-free service for years.

Wherever hot or corrosive liquids or gases are conveyed . . . wherever products must be protected from contamination . . . wherever it is important to know what is happening *inside* a line . . . there PYREX Piping gives you its most profitable service. See photo.

Chemical plants use it to eliminate corrosion problems, because it resists all hot or cold acids (except HF). Food and beverage manufacturers like it because it's easy to keep clean, either by simple flushing or with steam or strong hot cleaning solutions. It helps to produce a purer product.

EASY TO INSTALL

Plant workmen find it easy to make installations themselves. Recently, green plant mechanics have done first-rate installations with PYREX Piping.

You may install from one piece to a whole system—for PYREX Piping may be joined to existing metal lines and equipment. And it is hung and supported much like other types of piping. We do recommend that hangers and supports be padded, to minimize scratching.

STANDS UP MECHANICALLY

PYREX Piping is recommended for working pressures up to 100 lbs. p.s.i. But glass in this form is not as strong as metal. So, care must be taken to avoid installation strains or sharp impact. Nearly 20 years of service under all kinds of plant conditions have proved that only simple common sense and reasonable care are required to handle PYREX Piping without trouble. The glass itself is very hard—about twice as resistant to abrasion as ordinary plate glass. Thus, the piping is particularly suitable for abrasive, corrosive slurries. You can install and use PYREX Piping with confidence.

AVAILABLE NOW

Glass-making materials are fairly plentiful. We do need priority ratings that enable us to get accessories (flanges, gaskets), to assign necessary labor, and to establish your order in our production line. With such priorities we have been making 6 to 8-week deliveries.

Available sizes and lengths: 1", 1½", 2", 3", and 4" diameters; any length from 6 inches to 10 feet (longer lengths on special request). There are corresponding ells, tees, return bends, and reducers.

Accessories: Compression type joints—with conical pipe ends compressed to a self-centering gasket by metal flanges and clamping bolts. We supply gaskets of materials suited to the liquid or gas you want to convey.

LOW COST

The initial cost of PYREX Piping (accessories included) is about the same or less than the cost of full-weight copper or brass piping, in comparable sizes, and is considerably less than the cost of stainless steel.

And because PYREX Piping does not wear out under acid attack, it gives long trouble-free service, with resultant low long-time cost.

WATCH FOR CORNING ADVERTISEMENTS!

Watch this magazine for more information in Corning's advertisements headed "What every plant operator should know about Glass Piping." And write for PYREX Piping Bulletin No. 814. Industrial Division, Corning Glass Works, Corning, N. Y. Branch Offices: New York, 718 Fifth Ave.; Chicago, Merchandise Mart.

"PYREX" is a registered trade-mark and indicates manufacture by Corning Glass Works, Corning N. Y.

CORNING
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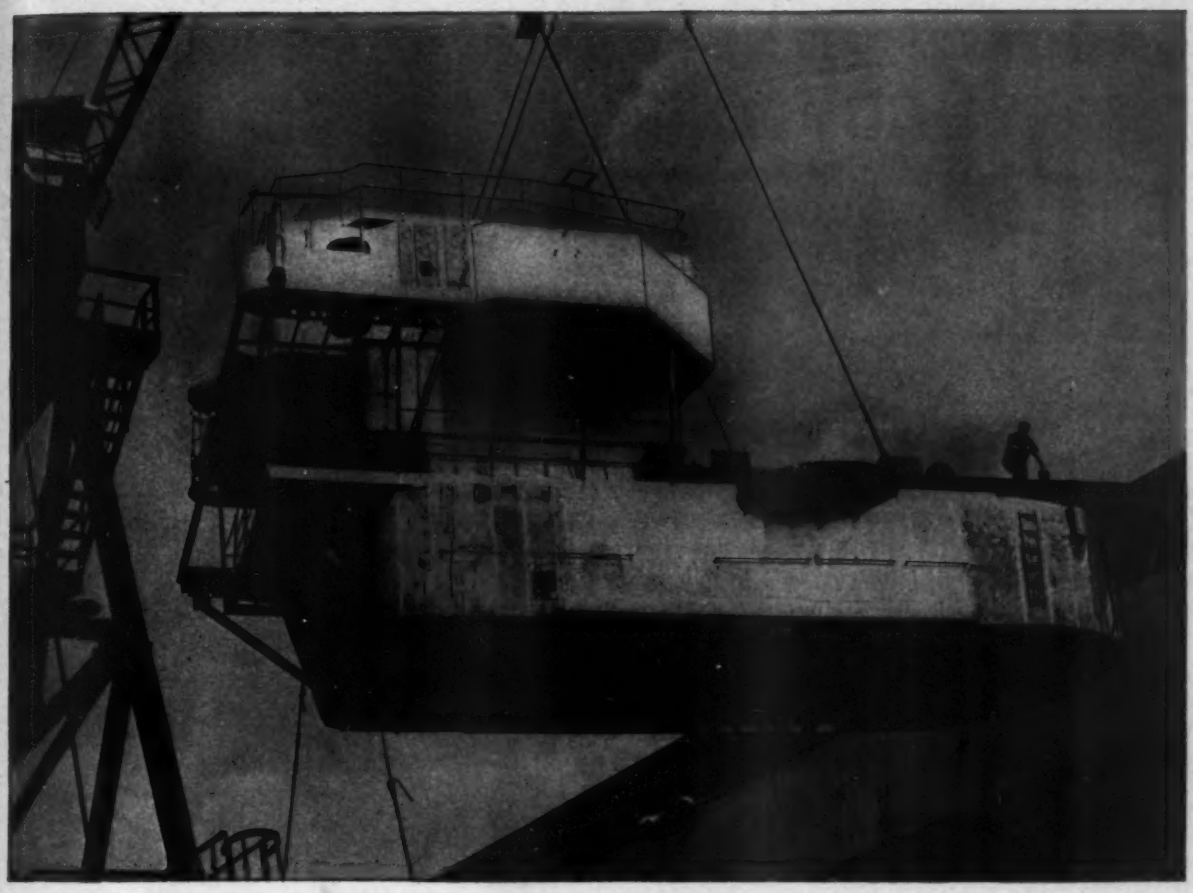
Pyrex Industrial Glass



PROTECT YOUR CABLES for Vital War Work

SETTING in place this 40-ton destroyer deckhouse and other huge prefabricated ship sections represents one of the important wartime uses of wire rope.

To keep cranes, shovels, hoists, draglines, derricks in service . . . doing vital war work . . . operators everywhere are protecting their wire rope by lubricating it with *Texaco Crater*.

Texaco Crater penetrates to the very core of wire rope, sealing each wire in a tough, viscous film that reduces internal friction and wear, keeps out moisture, prevents corrosion, makes ropes last longer.

So effective have Texaco Lubricants proved in increasing output that they are definitely preferred in many important fields, a few of which are listed in the panel.

A Texaco Lubrication Engineer will gladly cooperate in the selection of the most suitable lubricants for your equipment. Just phone the nearest of more than 2300 Texaco distributing points in the 48 States, or write:

☆ ☆ ☆

The Texas Company, 135 East 42nd Street, New York, N. Y.

THEY PREFER TEXACO

★ More Diesel horsepower on streamlined trains in the U. S. is lubricated with Texaco than with all other brands combined.

★ More locomotives and railroad cars in the U. S. are lubricated with Texaco than with any other brand.

★ More revenue airline miles in the U. S. are flown with Texaco than with any other brand.

★ More buses, more bus lines and more bus-miles are lubricated and fueled with Texaco than with any other brand.

★ More stationary Diesel horsepower in the U. S. is lubricated with Texaco than with any other brand.

TEXACO

REG. T.M.

TEXACO Lubricants

FOR THE PAPER INDUSTRY

TUNE IN FRED ALLEN EVERY SUNDAY NIGHT—CBS ★ HELP WIN THE WAR BY RETURNING EMPTY DRUMS PROMPTLY

Cool as a Cucumber

—AT 6 MILES A MINUTE!

MEET the fighter that's blasting the Axis out of the sky! It rockets along at better than 400 miles an hour . . . powered by a liquid-cooled engine. Ethylene glycol (permanent anti-freeze to you!) is an important factor in its cooling system.

Chlorine, prime processing agent in the manufacture of ethylene glycol, is but one of the many Mathieson products which are contributing directly to the production of war materials. To mention only a few of the essential war uses of Mathieson chlorine, it plays an important part in the manufacture of aluminum . . . plastics . . . synthetic rubber . . . petroleum products and high explosives. Other basic "war chemicals", manufactured by The Mathieson Alkali Works and supplied directly to war industries or to our armed forces, include caustic soda, ammonia, soda ash, carbon dioxide and calcium hypochlorite. A highly mobile, dry chlorine carrier, calcium hypochlorite is used extensively at training centers and other military establishments to combat the deadly menace of waterborne diseases.

In a larger sense, Mathieson Chemicals are fighting a menace greater and more deadly than any the world has ever known—the arrogant, over-weening ambitions of the Axis tyrants, men without conscience and without mercy. Until they are removed forever from the high places of evil, there can be no let-up in the pace of war production here at Mathieson.

For outstanding achievement in the production of war materials.

Mathieson CHEMICALS

THE MATHIESON ALKALI WORKS (INC.)
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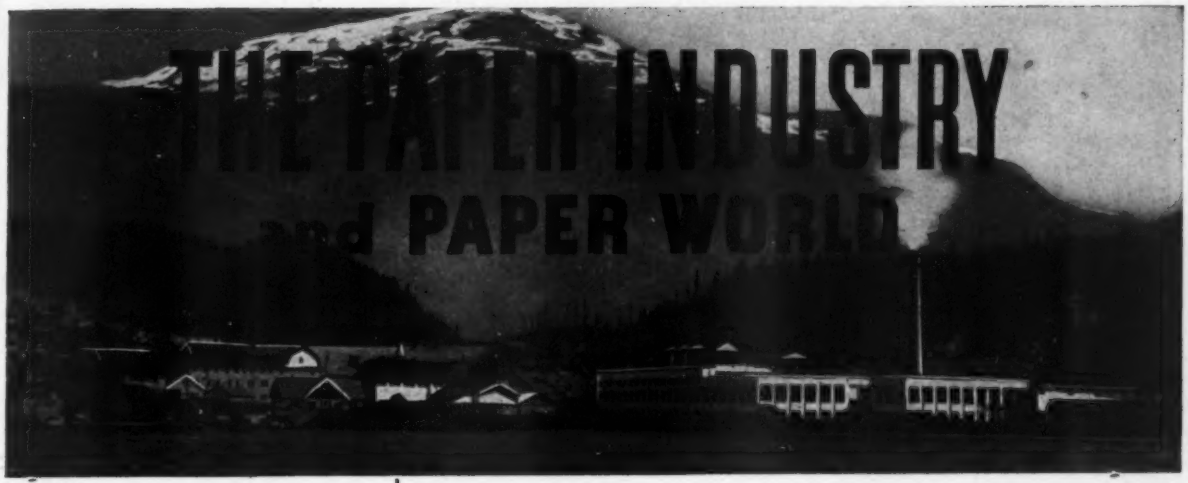

Published monthly by

FRITZ PUBLICATIONS, INC.

59 E. Van Buren St., Chicago, Ill.

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THE PAPER INDUSTRY and PAPER WORLD is indexed regularly in *The Industrial Arts Index*. An index to each volume is issued annually by the publisher as Section Two of the April number.

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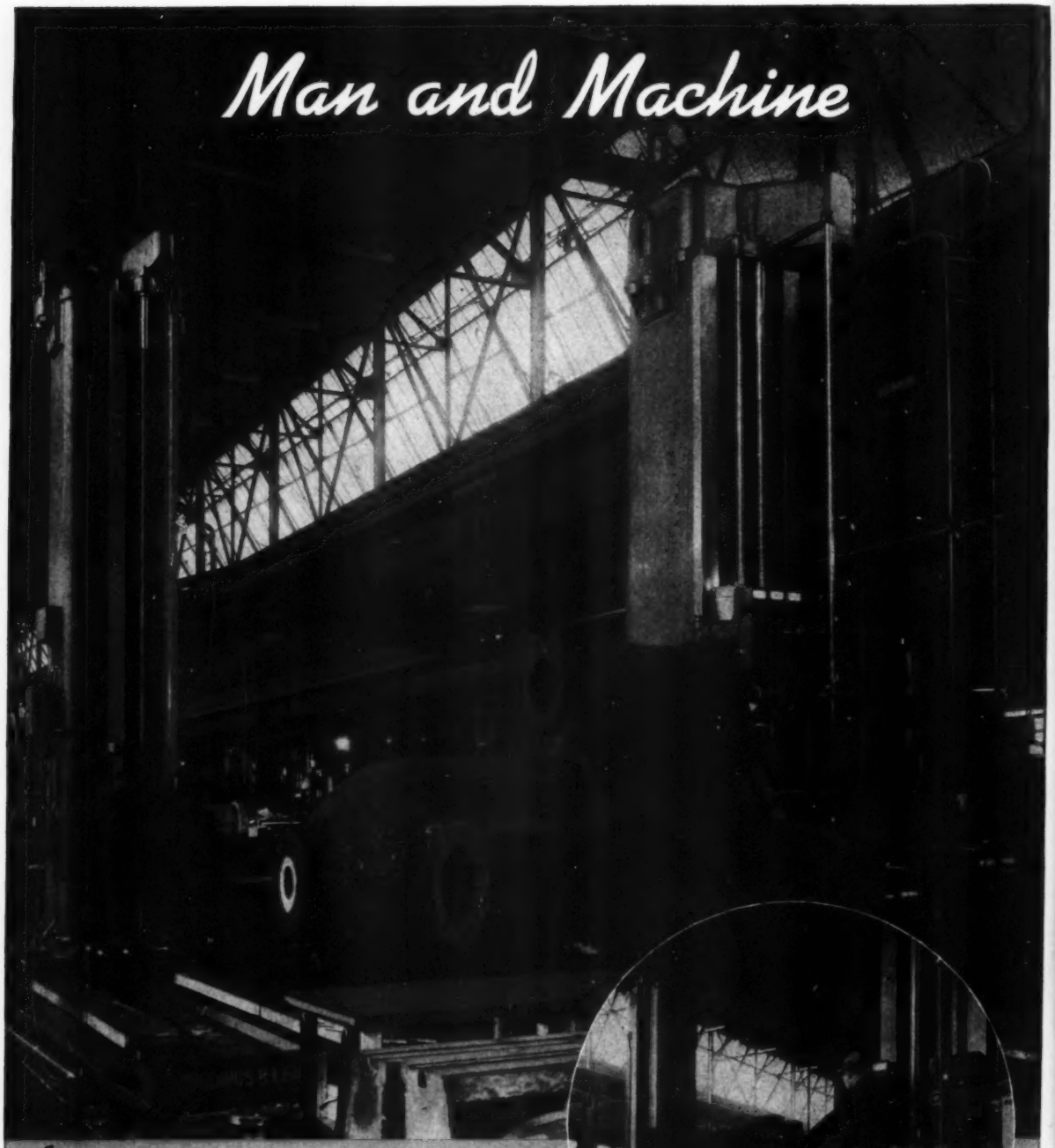
Entered as second class matter June 29, 1938, at the post office at Chicago, Ill., under the Act of March 3, 1879. Subscriptions in the United States, U. S. Possessions, Canada, Cuba and Mexico, $2.00 for one year, $3.00 for two years. All other countries $3.00 for one year, $5.00 for two years.

Man and Machine

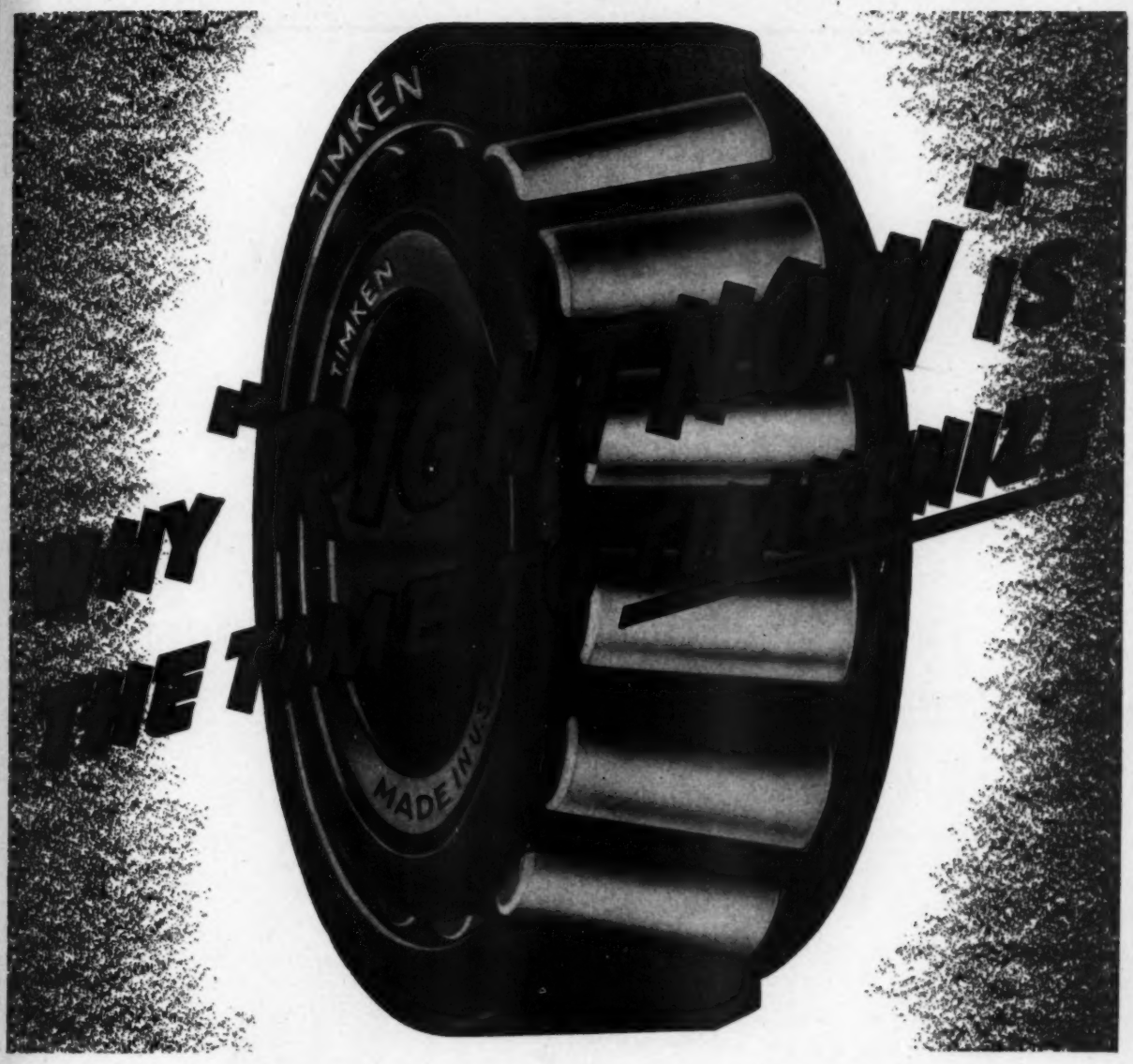


ONE complements the other, and what a job the two are doing every day in backing up the boys in our armed forces by producing the equipment and armament that they need.

Skilled men imbued with the American spirit of democracy and trained in plants where precision standards are the highest are proving that they and their machines can give what it takes.

Bagley and Sewall, with an eye towards the future, is ever mindful that one day their customers will again expect to find available the same skill and precision in paper making equipment that they came to recognize and demand.

THE BAGLEY & SEWALL COMPANY • WATERTOWN, NEW YORK



War production requirements have given great stimulus to improvements in machine design.

This trend not only affects fighting equipment, but also every kind of industrial machine.

It will become even more pronounced during the reconstruction period following Victory.

That's why it will pay you—*right now*—to redesign your product to include Timken Bearings at every possible point.

By doing so you will help the war effort; and furthermore you will be all prepared for the competitive post-war period with a better *performing* and a better *selling* product. "Timken Bearing Equipped" assures superiority to equipment buyers everywhere.

THE TIMKEN ROLLER BEARING COMPANY, CANTON, OHIO

TIMKEN *TAPERED ROLLER* BEARINGS

PAPER IS A WAR ESSENTIAL

War-time Service Meeting
of Superintendents

THE AMERICAN PULP AND PAPER MILL SUPERINTENDENTS ASSOCIATION, INC.

June 15, 16, 17, 1943

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The Commodore Hotel - - - New York City

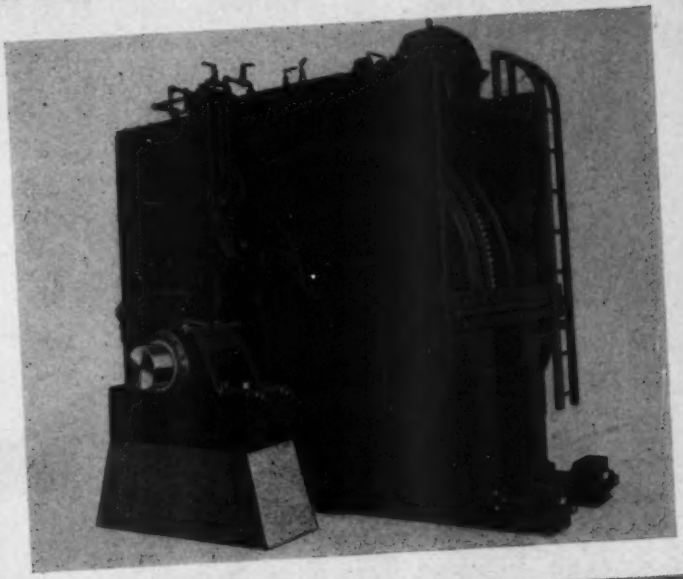
Write Hotel for Reservations

GROUNDWOOD MILLS

for

FUTURE REFERENCE

ROBERTS GRINDER



YOU cannot get new Roberts Grinders today. But if you manufacture groundwood pulp this modern equipment should be right up at the top in your plans for future improvements or post-war expansion. It will increase your daily tonnage while reducing manufacturing costs per ton. There will be impressive savings in power and labor, less waste, improved quality. The Roberts Grinder does the work of 3 or 4 pocket grinders yet takes little more space than a single 3 pocket grinder, requires no greater headroom, no auxiliary equipment. The wood is fed to the stone continuously, there is no down-time. Yes, the Roberts Grinder grinds more pulp in less time at lower cost per ton. It is the grinder you will want tomorrow.

Performance records tell why the Roberts Grinder is a faster and more profitable way to grind pulp for paper. We will gladly give you complete information, mechanical specifications, installation details, and operating data. This information might be most useful to you in planning for the future.

THE APPLETON MACHINE COMPANY

APPLETON · WISCONSIN

Would you turn your back on a wounded Soldier?

You think you wouldn't...you don't mean to...

But unless you are giving every precious minute of your time... every ounce of strength that you can spare... towards helping win this war as a civilian, you are letting down those soldiers who are sacrificing lives to win it for you.

What you are asked to give up isn't much compared with what they're giving up. The extra work you undertake is small compared with the gigantic effort they are making. But to a wounded soldier, what you do can mean the difference between life and death.

You make the choice.

LOOK AROUND YOU! *Pick your war activity—and get into it! In your local Citizens Service Corps or Defense Council there is something for every man, woman and child to do. If no such groups exist in your community, help to organize them. Write to this magazine for free booklet, "You and the War," telling what you can do to help defeat the Axis. Find your job—and give it all you've got!*

Contributed by the Magazine Publishers of America

EVERY CIVILIAN A FIGHTER

"Women in the Paper Industry"

▶▶▶ IN MAY, 1942, the Industrial Relations Committee made a survey of "Women in the Paper Industry," which showed that the problem was not acute at that time; in fact, the use of women to replace men had hardly started in the Paper Industry, and too, the change-over did not appear to be of any consequence much before 1943. Your committee appreciated this situation and believed it advisable to review the problem early in 1943.

In March of this year, questionnaires were sent to the member mills and as a consequence a summary of the answers received shows a rapid development along the lines of replacing men with women in the Paper Industry.

The summary covers approximately a hundred paper companies, employing better than 70,000 people out of an estimated 140,000 in the whole industry. It shows that the percentage of women employed has increased slightly better than 50 per cent so far this year as compared to 1942, and it is estimated that within the next few months the number of women employed in the Paper Industry will be double that of 1942.

The rapid development of this trend made the committee feel that those in the industry who had found it advisable to make this change already would have learned things of interest and help to those who are just now feeling the pinch of manpower shortage or who may feel it more intensely before the year is out.

Of course, the degree of manpower shortage determines the extent to which women will replace men. Isolated cases show that a woman physically fitted for a given job can do it nearly as well, and in some cases, better than the men formerly holding it down. This point must be kept in mind, all men are not physically able to do all jobs and, as a consequence, are not expected to. Too many feel that no female can properly fill paper mill jobs and it all depends on how badly it is desired to keep a mill running, if male help is non-existent but female help is available. Nevertheless, a women properly selected and trained can do practically all jobs in the Paper Industry and this is an important point of view to realize.

Once it is decided to employ women in the place of men an all-important point is to prepare foremen and employees. Impress upon them the need of facing reality. If a mill is to operate so that all men and foremen can work now, and also, to maintain an organization to operate when this is over, then it is common sense to bring women in, to help to train them and to realize that training takes time. It will be advisable to bring them into the picture before the actual vacancies exist in order to train them and also before other industries place them and thereby develop a shortage in desirable womanpower. This is not an easy job, but efforts along this line will save a lot of headaches later on.

State laws pertaining to female labor are exacting in some states. It is wise to become familiar with those in your state. Some state Industrial Commissions can and will grant permission to deviate from the law. It is important to know how much deviation they will grant on such things as maximum hours of work per week, consecutive days of work, consecutive hours of work without a rest period, maximum weight that females can lift, age limits, whether or not certain aged girls can work at night, how late, etc. It is advisable to know whether the state authorities can grant complete exemption or whether such extension only applies to any action they themselves might take but leave you open to suit for damages by the dissatisfied employee or interested groups outside of the mill. The Paper Industry is operating under abnormal conditions as is all industry, but it is not advisable to take too much for granted on state laws.

As additional women are employed, it becomes important to be alert to any real or fancied grievances on the part of these new female employees. Often times they are looked down upon by the older employees. Sometimes this attitude is based on fact, sometimes it is only fancy, but in any event it is an important factor in the control of turnover on these new women. Special effort should be expended to make them feel that they belong. The turnover can be high, training is costly and it is very discouraging when you go through it only to see them go to another plant after a couple of months.

The particular desirability of employing married or single women finds no decided opinion on the basis of the answers received.

Very few companies utilize special training classes for women employees but apparently use the same methods of training women as they have men.

Approximately 85 per cent of the companies reporting on the effect of costs, felt that the increased use of female employees had increased costs but little, if any.

Nearly 80 per cent of the companies

EDITOR'S NOTE: The American Paper and Pulp Association has conducted a survey of women employed in the paper industry. The accompanying report of the sub-committee of the Industrial Relations Committee contains information acquired through this survey. A statistical summary listing occupations now being filled by women in the pulp and paper industry accompanied this report but is not reproduced here.

reporting on the question of rates paid to women said that they did not pay them the rate of the man replaced unless the female employee fully performed the job as the man had done before. The principle of "equal pay for equal work" should apply but merely taking over a *job title* formerly held by a male employee does not necessarily mean that she completely fills the job, and as a consequence is not entitled to the rate formerly paid to a man. It is to be noted that General Order No. 16, issued by the War Labor Board, states that it permits employers to make wage and salary adjustments to equalize the wages of women with those of men, where there is a comparable *quality* and *quantity* of work done. The Board's approval need not be obtained beforehand, but you are required to report such adjustments.

The matter of uniforms for women employees is a touchy one but must be taken into consideration, particularly from the point of view of safety. The long hair that women affect makes them essentially different than men and probably is the outstanding thing to consider as far as they are concerned. The presence of static electricity in some paper mill operations may create a particular hazard for long hair, as well as revolving shafts, etc.

Whether or not women will be considered as permanent or temporary employees is a matter for each company to decide. Some companies feel that it is advisable to have new women employees sign a statement that they fully understand that they are hired for the duration only. Other companies feel that such a procedure enhances a feeling of insecurity and feel that turnover on these new girls can be decreased if this feeling of insecurity is removed, following the idea that they will be entitled to the same consideration in the future as other employees if and when such a situation develops that makes it necessary to adjust working forces.

In the foregoing the Industrial Relations Committee brings out the highlights of experiences gained from "Women Employed in the Paper Industry." The committee feels that the survey shows that: (1) The degree of manpower shortage will determine the extent which it is necessary to go into the female labor field, (2) That it is important to prepare for replacement of men with women, and such preparation includes supervision, present employees, company policies, etc. (3) If a shortage of manpower looks probable it is important to act before the available womanpower is utilized elsewhere, and finally, that women can and are being very successfully employed in Paper and Pulp operations.

PRESENT PERSONNEL OF P. & P. INDUSTRY ADVISORY COMMITTEE

The Pulp and Paper Industry Advisory Committee of the WPB is now composed of the following:

Elmer Anderson, American Reinforced Paper Company

Hugh D. Camp, Chesapeake-Camp Corporation

H. P. Carruth, Union Bag and Paper Corporation

D. C. Everest, Marathon Paper Mills Company

Gordon Friend, Thomas M. Royal Company

E. T. Gardner, Gardner-Richardson Company

W. S. Goodspeed, American Box Board Company

John H. Hinman, International Paper Company

Grafton Houston, Fort Howard Paper Company

J. W. Kieckhefer, Kieckhefer Container Company

David L. Luke, Jr., West Virginia Pulp and Paper Company

Vasco E. Nunez, Nashua Gummed and Coated Paper Company

Samuel Pruyn, Finch Pruyn and Company

John L. Riegel, Riegel Paper Corporation

J. Donald Smeallie, Smeallie and Voorhees, Inc.

Carlton W. Smith, Miamisburg Paper Company, Division of American Envelope Company

Norman W. Wilson, Hammermill Paper Company

J. D. Zellerbach, Crown Zellerbach Corporation

John D. Zink, Strathmore Paper Company

Arthur G. Wakeman, Director of the Pulp and Paper Division of WPB, is chairman of the committee, which meets in Washington at least once each month or as deemed necessary by Mr. Wakeman.

◆

FINANCIAL

▶▶▶ SECURITIES MARKETS remained firm during April, and paper mill stocks and bonds reflected the continuing optimism as to business prospects. The averages for the month, however, were approximately the same as a month ago, with some sporadic cases in which advances were seen.

Brown Company—Net profit for the year ended November 30, 1942, was $1,071,087, after depreciation, interest, income and excess profit taxes, as compared with $1,484,353 in 1941.

Celotex Corporation—Net profit for three months ended January 31, 1943, was $275,575 as against $278,291 for the comparable quarter a year ago.

Container Corporation—Net profit for the March quarter was $468,313 as against $705,714 for the same quarter in 1942.

Continental-Diamond Fibre Company—Net profit in 1942, after deduction of $1,653,500 in taxes, was $741,006 as against $895,860 in 1941.

Flambeau Paper Company—Net income for 1942 was $140,690 as against $200,950 in 1941.

Gaylord Container Corporation—Net income for 1942 was $1,108,543, or $1.55 per common share, as against $1,349,125, or $1.98 per share, in 1941.

Hollingsworth & Whitney — In 1942, stockholders received $3.39 per share, while taxes totaled $10.78 per share.

Hummel-Ross Fibre Corporation—Net profit for the fiscal year ending December 26, 1942, was $405,696 as against $604,145 for the preceding year.

International Paper Company—Net profit in 1942 was $7,814,319 as compared with $16,253,761 (which includes results of operation of the foreign subsidiaries) in 1941. Total sales were only 2 per cent below those of 1941, however, the reduction in net revenue being due to $26,194,550 in taxes, plus the reduced income due to the freezing of sales prices at approximately 1941 levels, while costs of production increased. In some grades, 1942 ceiling prices were even lower than the current prices in 1941.

Kimberly-Clark Corporation — Net profit in 1942 was $1,587,000 after provision for payment of dividends on the preferred stock.

Lily-Tulip Corporation—Net profit for 1942 was $694,906 as against $820,325 in 1941.

Mead Corporation—Net profit for 1942 was $1,357,470 as against $2,109,785 in 1941.

Minnesota & Ontario Paper Company—Net profit in 1942 was $1,616,863 as against $1,827,516 in 1941.

National Container Corporation—Net profit in 1942 was $654,833 as against $1,073,435 in 1941.

Puget Sound Pulp & Timber Company — Net profit in 1942 was $878,611 as against $1,076,178 in 1941.

River Raisin Paper Company—Net profit in 1942 was $142,285 as against $485,313 in 1941.

PAPER · · · America's 6th Industry

"SPECIAL DELIVERY"

(NEWS ITEM: *Among the new fiber board packages which replace former metal containers are new types of fiber containers, with metal rims, for packaging shells, howitzers and hand grenades.*)

Water-proof paperboard shell containers are saving thousands of tons of weight on America's fighting ships as well as releasing vital materials needed to speed our Victory Program.

These damage and water resistant cartons measure up to rigid Government Specifications under the most trying conditions.

The Paper Industry is fighting the war on every battlefront . . . providing containers for the storage and shipment of food, equipment and munitions to our Armed Forces.

The whole-hearted cooperation of Puseyjones engineers is offered to mills seeking higher speeds, better formations, and continuous and uniform production.

The improved Puseyjones Size Press does the surface sizing continuously at top running speeds with no loss in production.

Assures a non-glare surface, increases erasing qualities, and adds stiffness and snap for easy handling. This improved Size Press can be used on new or old machines.

Puseyjones men and production facilities are on war work. In the meantime, we are doing our best to supply replacement parts to keep present equipment operating efficiently. All orders subject to priority conditions of War Production Board.

PLANNING AHEAD? For paper and pulp mill executives looking forward to post war production problems, we will gladly furnish reprints of three informative articles prepared by Puseyjones engineers — "The Post-War Fourdrinier Machine," "Development of Stream-Flow Vat System," "The Flow Spreader." Ask for reprints by name.

THE PUSEY AND JONES CORPORATION

Established 1848. Builders of Paper-Making Machinery

Wilmington, Delaware, U. S. A.

St. Regis Paper Company — Net profit in 1942 was $1,680,091 as against a net in 1941 of $3,228,080. A recapitalization plan is suggested to facilitate the clearing up of arrears on the company's preferred stock.

Simplex Paper Corporation — Net profit in 1942 was $130,000 as against $172,662 in 1941.

Southland Paper Mills—Net profit in 1942 was $781,842, a reduction from the net profit in the preceding year.

Sutherland Paper Company — Net income for the three months ended March 31, was $183,637 as against $244,194 a year ago.

Westfield River Paper Company—Net profit in 1942 was $54,359 as against $69,254 in 1941.

Worthy Paper Company Association —Net profit in 1942 was $17,557 as against $13,795 in 1941.

New York Stock Exchange—Stocks

	Closing Prices April 24, 1943	March 25, 1943
A. P. W. Paper Co...	*2½	*2½–2¾
Celotex	13⅞	13
Same Preferred.....	90	85–87½
Certain-teed	6	6⅛
Same Preferred.....	59	58
Champion P. & F. Co.	20	18½
Same Preferred.....105		103¼
Container Corp.	22⅜	22⅜
Cont. Diamond	14	13¾
Crown Zellerbach.....	14½	13⅛
Same Preferred.....	91½	88¾
Dixie Vortex	13¾	13⅜
Same "A"	39⅞	*39¾–39⅞
Robert Gair	3⅞	3½
Same Preferred.....	14	12¾
Gaylord Container....	14⅛	14
Same Preferred.....*53–53¼		*52½–55
International Paper....	11⅞	12¾
Same Preferred.....	58½	59½
Kimberly-Clark	29½	29
MacAndrews & Forbes	27⅜	23⅛
Masonite	33¾	*35½–36
Mead Corp.	9¼	9
Same Preferred.....	83	*86–88½
Paraffine Cos.	41½	*39–41
Same Preferred.....*97–99		*98½–101
Rayonier	13	13⅜
Same Preferred.....	29¼	*28¾–29
Scott Paper	42	40¼
Same 4½% Pfd.....112		*112½–113
Same 4% Pfd. 109		110–113½
Union Bag & Paper....	10	11⅛
U. S. Gypsum.....	67	68¼
Same Preferred.....181		179

New York Stock Exchange—Bonds

Abitibi 5%	.....	62
Celotex 4½% 101		102⅛
Certain-teed 5½%	99⅛	99¼
Champion P. & F. Co. 4¾%	.....	.....
International Paper 5% 103¾		104
Same 6% 106		106½

New York Curb Exchange—Stocks

Am. Boxboard	7	6¼
Great Northern.....	33	35
Hummel Ross.....	5	5¼
St. Regis	2⅛	2¾
Taggart	3⅞	3⅞
United Wall Paper....	2⅞	2¾

*Closing Bid and Asked Prices.

FLATHEAD CO. STARTS SAW MILL OPERATION

The Flathead Pulp and Paper Company, of Missoula, Montana, began operations on April 19 at the Polson mill, recently acquired from the Dewey Lumber Company (Cf. THE PAPER INDUSTRY AND PAPER WORLD, March, 1943, p. 1200).

The option on the property was taken up the week previous to the opening, and for three weeks before that loggers had been preparing logs for the start of the sawing operations. As soon as there are enough saw logs at the mill, two crews will be put on. The new company also expects to promote the establishment of a plywood plant at Polson.

◆

F. G. BARBER WILL STUDY WIDER USES FOR PAPERBOARD

In his new position as assistant to the chief of the container division in the Navy Department's office of procurement and material, Frederic G. Barber will make a study of wider use of paperboard and paper products as substitutes for more critical materials. Mr. Barber, who has had extensive experience in the paper and container industries, was formerly consultant to the pulp and paper unit of the Office of Civilian Supply.

He will maintain contact between the paper and paper converting industries, the various Navy Department bureaus, and the War Production Board, in an effort to discover new places where paper and paperboards can be applied in the war effort.

◆

NEWARK COMPANY MARKS ITS 40TH ANNIVERSARY

The Newark Paraffine & Parchment Paper Company, Newark, New Jersey, is observing its 40th anniversary. Founded in 1903, by Moritz Eisner, the business is headed by William J. Eisner, president, and Stanley J. Eisner, secretary-treasurer.

This company operates the Pittston Paper Corporation, a paper mill located at Pittston, Pennsylvania, and carries on waxing, printing and finishing operations at the Newark plant. It also maintains its own ink manufacturing division, a bag department where bags are printed and fabricated, and an art department and package research division.

This company was one of the pioneers in bread wrappers. The first printed wrapper made by the company was a one-color design eight inches square on a 24x36-inch sheet.

GRATON & KNIGHT

ALABAMA
Birmingham — The Young & Vann Supply Company
Mobile — McGowin-Lyons Hdwe. & Supply Company

ARIZONA
Kingman — Tarr, McComb & Ware Commercial Company
Tucson — Albert Steinfeld & Co., Inc.

ARKANSAS
Helena — Lewis Supply Co.
Pine Bluff—Arkansas Mill Supply Co., Inc.
Texarkana — Buhrman-Pharr Hdwe. Co.

CALIFORNIA
Bakersfield—Hopper Machine Works, Inc.
El Centro — Imperial Hardware Co.
Fresno and Los Angeles — Pacific Mill & Mine Supply Co.
Oakland — Bay City Iron Works
Sacramento — Sacramento Rubber Co.
San Francisco—Honolulu Iron Works Co.
Stockton — Geiger Iron Works, Inc.

CONNECTICUT
Bridgeport — Hunter & Havens, Inc.
New Haven—The Page, Steele & Flagg Co.
Plainville — Ideal Machinery Co.
Stamford — The Geo. W. Southwick Co.
Waterbury — The White Supply Co.

DISTRICT OF COLUMBIA
Washington — Nat. Equip. & Supply Co.

FLORIDA
Jacksonville—The Cameron & Barkley Co.
Miami — The Cameron & Barkley Co.
Tampa — The Cameron & Barkley Co.

GEORGIA
Atlanta — Fulton Supply Co.
Columbus — Columbus Iron Works Co.
Rome — Battey Machinery Company

ILLINOIS
Chicago and Moline — Sterling Products Company, Inc.
Decatur — The Field & Shorb Co.
Quincy — E. Best Plbg. & Htg. Supply Co.
Rockford — Mid-States Industrial Corp.

INDIANA
Indianapolis — Van Camp Hardware & Iron Co.

IOWA
Des Moines — Globe Machinery & Supply Company

KANSAS
Leavenworth — Great Western Mfg. Co.

KENTUCKY
Hopkinsville — Cayce Mill Supply Co.
Louisville and Lexington — Tafel Electric & Supply Co.
Paducah — Henry A. Petter Supply Co.

LOUISIANA
Monroe — Weaks Supply Company, Ltd.
New Orleans — Standard Supply & Hdwe. Company, Inc.

MAINE
Portland — W. L. Blake & Company

MARYLAND
Baltimore — The L. A. Benson Co., Inc.
Salisbury — The R. D. Grier & Sons Co.

MASSACHUSETTS
Fall River — Harold F. Wordell
Holyoke — J. Russell & Co., Inc.
Lowell—The Fairgrieve Belting Co., Inc.
New Bedford — Manufacturers' Supply Company, Inc.
Taunton—The Pierce Hardware Co., Inc.

MICHIGAN
Battle Creek — Kendall Hdwe. & Mill Supply Company
Bay City — Chevrier Supply Co.
Escanaba — Delta Hardware Co.
Houghton — I. E. Swift Company
Kalamazoo — Kalamazoo Mill Supply Co.
Lansing — Michigan Supply Co.
Menominee—North'n Hdwe. & Supply Co.
Port Huron—Moak Machine & Supply Co.
Sault Ste. Marie — Soo Hardware Co.

MINNESOTA
Duluth — Kelley-How-Thomson Co.

DISTRIBUTORS

MISSOURI
Kansas City — Langdon Supply Co.
Richards & Conover Hdwe. Co.
H. R. Williams Mill Supply Company
St. Joseph—Jamieson Machine Company
NEBRASKA
Omaha — American Machinery & Supply Company
NEW HAMPSHIRE
Keene — M. S. Perkins Machine Co.
NEW JERSEY
Newark—Dodge-Newark Supply Co., Inc.
Passaic—New Jersey Eng. & Supply Co.
NEW YORK
Buffalo — Weed & Company
Elmira — Barker, Rose & Kimball, Inc.
Lockport—Ward Bros. Mill Supply Co., Inc.
Newburgh — W. L. Smith
Rochester — Haverstick & Company, Inc.
Syracuse — Onondaga Supply Co.
Troy — Fred K. Blanchard, Inc.
NORTH CAROLINA
Charlotte — The Textile Mill Supply Co.
OHIO
Akron & Massillon — The Hardware & Supply Co.
Cincinnati — The Scallan Supply Co.
Cleveland — The Geo. Worthington Co.
Columbus—The Smith Bros. Hardw'e Co.
Dayton — Dayton Industrial Supply Co.
Findlay & Toledo — Bearing & Transmission Co.
Mansfield — The Hughes Supply Co.
OKLAHOMA
Oklahoma City — Federal Supply Co.
OREGON
Klamath Falls — Lorenz Company
Portland — Harris Supply Company
PENNSYLVANIA
Allentown — William H. Taylor Co., Inc.
Pittsburgh — Somers, Fitler & Todd Co.
Reading — Brown Engineering Company
Scranton — The Chas. B. Scott Company
Wilkes-Barre — Eastern Pennsylvania Supply Company
York — George F. Motter's Sons
RHODE ISLAND
Providence — W. E. Lamarine
SOUTH CAROLINA
Charleston—The Cameron & Barkley Co.
Greenville — Hugh Black
TENNESSEE
Jackson — Southern Supply Company
Knoxville—Tenn. Mill & Mine Supply Co.
Memphis — Lewis Supply Company
Nashville — Keith, Simmons Co., nc.
TEXAS
Dallas — The Murray Co.
El Paso — Momsen-Dunnegan-Ryan Co., Inc.
Houston — Peden Iron and Steel Co.
UTAH
Salt Lake City—The Salt Lake Hdwe. Co.
VERMONT
Burlington — Hagar Hdwe. & Paint Co.
VIRGINIA
Lynchburg—Barker-Jennings Hdwe. Corp.
Newport News — Noland Company, Inc.
Norfolk — Taylor-Parker Company, Inc.
Richmond — Industrial Supply Corp.
Roanoke — Noland Company, Inc.
WASHINGTON
Aberdeen — Mill & Logging Supply Co.
Seattle — Chas. H. Harden Co.
Spokane—Wash'ton Mach'y & Supply Co.
Tacoma and Olympia — Ducharme Belting and Rubber Company
Yakima — Yakima Hardware Company
WEST VIRGINIA
Elkins — Valley Supply Company
Fairmont — Fairmont Supply Co.
Huntington — Banks-Miller Supply Co.
WISCONSIN
Eau Claire — W. H. Hobbs Supply Co.
Green Bay — Morley-Murphy Company
Milwaukee—Morman Belting & S'pply Co.
Racine — Mohr-Jones Hardware Co.
Sheboygan — Frank Geele Hdwe. Co.
Wausau — D. J. Murray Mfg. Co.

On Severe Paper Mill Drives Waterproof Research Leather Belting Outperforms Rubber Belts

On pivoted base drives — beaters, jordans, chippers, pumps — Research Leather Belting has the necessary pliability to take that constant flexing with less internal friction than any other belt — rubber or leather. Its built-in pulley grip permits less tension to be used, relieving wear on bearings as well as belt. Natural overload capacity is another advantage.

On fixed center drives — especially for high speed, high torque, cone pulleys — Research Leather Belting maintains uniform speed much longer, with fewer stops for takeup. Excessive stretch is eliminated in manufacturing, so more power is delivered — at least 3% more production guaranteed.

Research Leather Belting on Pivoted Motor Base Drive

GRATON & KNIGHT CO., Worcester, Mass.

Only leather belting manufacturer with complete nation-wide service facilities. Branches in Chicago, Cleveland, Dallas, Detroit, Kansas City, Minneapolis, New York, Philadelphia, San Francisco. See adjoining column for distributors (also listed in THOMAS' REGISTER.)

Washington News

▶▶▶ AN ORDER issued by the War Manpower Commission fails to clarify the question of whether paper and pulp mill workers are employed in an essential industry, and therefore not subject to orders transferring them to war industries. Some branches of the industry have been declared essential, but only in a few cases, involving a comparatively small part of the manpower of the industry. It has repeatedly been stated that some clarification of this situation will soon be issued, and that meanwhile paper and pulp mill workers should not change their employment pending the issuance of a formal order. Meanwhile, the turn-over of employment is the greatest on record, involving about 2,000 per month in the last year, throughout the industry. Women are being increasingly employed, in the prospect of further drafts on male labor, and in some cases they are even employed in place of beatermen and as fourth hands.

▶▶▶ PRICE CEILINGS FOR PULPWOOD are now in effect in all parts of the country, a new order fixing the price for the northeastern states at approximately existing levels. Previous orders had fixed ceilings on Lake States and Pacific Coast pulpwood and southern wood is now under a freezing order, pending the fixing of definite ceilings, the freeze fixing as maximum prices those in effect when the order went into effect.

▶▶▶ CASEIN is now under both allocation and ceiling orders, to restrict price advances and to apportion the available supply among those whose needs are most real.

▶▶▶ THE WAR PRODUCTION BOARD has announced that word from Canada indicates that the normal quota of newsprint for the third quarter of 1943 can be supplied, on the basis provided by limitation orders for the first part of the year. Agreements have been reaffirmed under which Canada will supply the United States with 1,550,000 cords of rough pulpwood and 1,278,000 tons of woodpulp during 1943.

▶▶▶ THE APPOINTMENT OF Arthur D. Whiteside as vice chairman of the War Production Board in charge of civilian requirements is expected to result in a relaxation on the current policy under which profits are the principal element to be considered when price ceilings are fixed. While the Office of Price Administration is in charge of price ceilings, Mr. Whiteside's business experience will doubtless have a bearing on inter-department relationships between the WPB and the OPA.

▶▶▶ A REVISION OF WPB ORDERS relating to fine writing paper will permit the use in all sizes of basis 11 for other than typewriter sizes. A previous limitation of the use of this weight of rag content paper to typewriter sizes forced some converters to use 13 pound basis paper, thereby using more sulphite pulp which is already in short supply.

▶▶▶ CONVERTERS OF PAPER for various special uses have been permitted to consume their present inventories of raw materials, by the fixing of new percentages for operation. Some articles on the prohibited list can be produced from inventory paper, while there is a change in the percentage permitted for other grades. Toilet tissue, for instance, can be produced at 110 per cent of the base period fixed by earlier orders.

◆

CHINESE ENGINEERS HERE TO STUDY FOR REBUILDING CHINA

Thirty-two young Chinese engineers, who hope some day to help rebuild industrial China, have arrived in the United States and are studying American engineering techniques under a program developed jointly by the Board of Economic Warfare and the National Resources Commission of China.

Under this program, they will work here for two years in fields which in most cases they selected as their major interest, each of them having had advanced training in Chinese technical schools and several years of actual experience in his chosen field. Prior to their arrival here, several of the young men helped rebuild industrial plants which were moved from the ravaged seacoast area to Western China.

Eight of the men have taken training positions with the Tennessee Valley Authority and the rest are with American industrial firms. Positions have also been found for three others who are still in China or on their way to this country.

The program is being sponsored by the Division of Cultural Relations of the Department of State. Since the industries to which the men have been assigned are engaged in war work, they are first accredited by the United States Army, and are paid by the National Resources Commission of China.

◆

REORGANIZATION OF BROWN CO. COMPLETED

A seven year reorganization effort for the Brown Company, Berlin, New Hampshire, was brought to a close recently when Judge John A. Peters in the Federal District court in Portland, Maine, found that the plan of reorganization had been consummated according to his orders and discharged the company's trustees in bankruptcy.

The company received authorization from the court to accept a $6,500,000 RFC loan in 1941, when Judge Peters ordered the reorganization plan put into effect.

◆

EXPLOSION RESULTS IN FIVE FATALITIES AT ALBEMARLE PLANT

The explosion of a sterilizing boiler in the rag-cleaning plant of the Albemarle Paper Company, Richmond, Virginia, on April 20 caused the death of five workers, including Lynton B. Knighton, assistant superintendent of the plant, and the injury of about 20 others.

The catastrophe occurred about 4:30 p. m. when the boiler, housed in a three-story frame building, suddenly blew up, sending broken timber, bits of machinery and other debris into the air. A section of the tank-like sterilizer hurtled across a 28-foot alley and became imbedded into the concrete and brick wall of the main building. About three dozen workers, most of them Negro men and women rag pickers, were estimated to have been in the plant when the explosion occurred. Damage was estimated at about $35,000 by F. D. Gottwald, president of the company.

State Labor Commissioner John Hopkins Hall, Jr., said inspectors from his department would make an investigation of the explosion. Virginia, unlike many states near by, has no law

With Dirt Conditions As They Are

Your BIRD SCREENS Were Never More Important

Bird Screens are the final barrier between the paper machine and the dirt that's coming through with most paper stock these days . . . Watch your screens. Keep them in top form. If you have any question as to proper installation, operation or maintenance, by all means get in touch with dirt removal headquarters here at South Walpole. We'll do everything we can to help you make the most of your Screens.

BIRD MACHINE COMPANY

SOUTH WALPOLE • MASSACHUSETTS

regulating the operations of boilers, and Mr. Hall said that he had been advocating passage of a state boiler code as a safety measure for the past 20 years and hoped the next Assembly would pass such a law.

◆

STATE-WIDE FORESTRY GROUP FORMED IN MINN.

To stimulate production of timber for vital war uses, a state-wide committee of executives of state forest products industries has been formed in Minnesota with L. A. Furlong, of Minnesota and Ontario Paper Company, Minneapolis, as chairman of the group. The new organization, known as Forest Industries Information Committee of Minnesota, was formed at the request of three national bodies and will be one of many state groups organized throughout the country. Sponsors are American Pulp and Paper Association, American Pulpwood Association, and National Lumber Manufacturers' Association.

Mr. Furlong said the state committees are being formed because estimated total production of timber products for 1943 is several billion feet below demand, and steps must be taken to stimulate this production. Membership in the new committee will include representatives of various forest products branches: namely, lumber, paper, pulp, and pulpwood. Among those already represented in Minnesota include, besides Mr. Furlong, C. K. Andrews, Blandin Paper Company, Grand Rapids; Fred W. Bessette, Minnesota Timber Producers Association; John C. Campbell, Jr., J. C. Campbell Timber Company; J. H. Jordan, Oliver Mining Company, all of Duluth; Frank A. Kelley, Northwest Paper Company, Cloquet; and F. M. Hilden, Minnesota and Ontario Paper Company, International Falls.

L. A. Furlong

FORESTRY AWARD TO BE GIVEN BY PRICE BROS.

The Quebec Forestry Association, whose officers include high-ranking officials of the Quebec Department of Lands, Forests, and Natural Resources, is at present studying plans to increase the number of its regional sections and its 4-H Clubs for boys and girls between 10 and 20 years of age. Regional groups have already been organized in such sections as the lower St. Lawrence, Gaspé, Gatineau-Pontiac, South Shore, and Lake St. John-Saguenay, and present plans call for further organization in the Eastern townships and in the St. Maurice Valley.

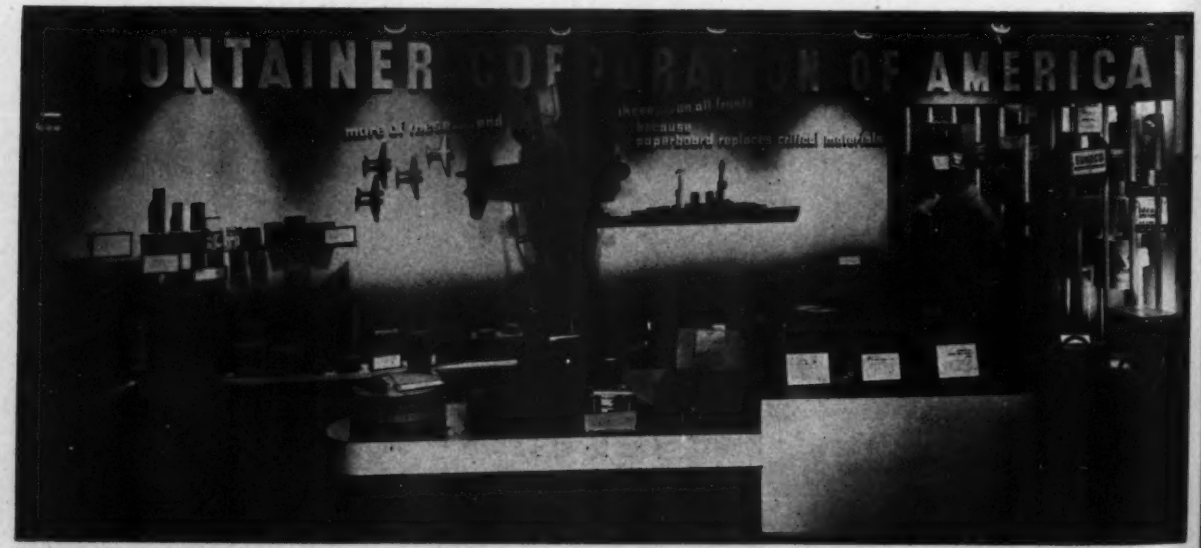
Price Brothers & Company, Ltd., Quebec City, Quebec, has announced that a $200 scholarship will be awarded for the next three years to the elected provincial president of the 4-H Clubs, Provincial Forestry Association. The winner will be given a course in forest conservation.

WARTIME PACKAGES SHOWN BY CONTAINER CORP. AT AMA EXPOS.

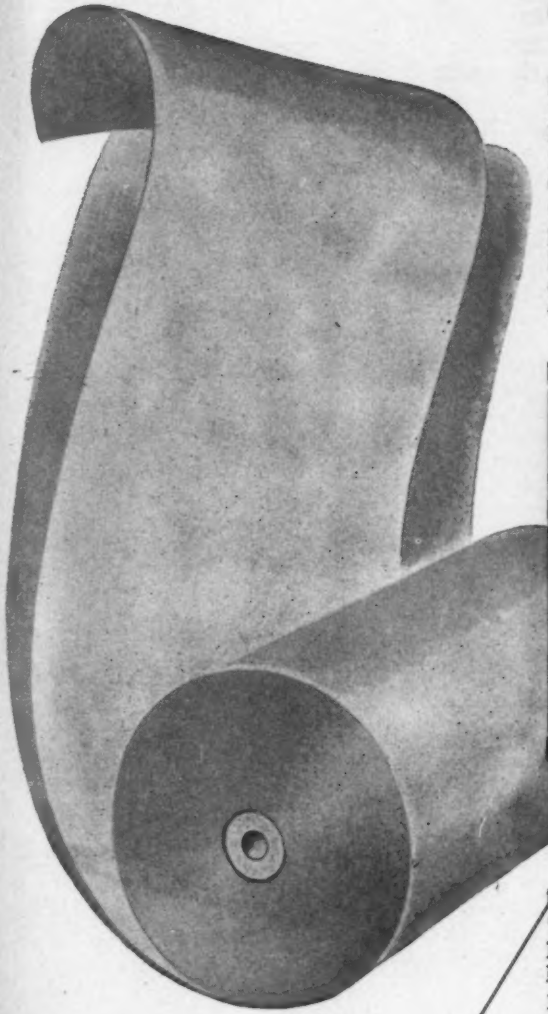
At the annual A.M.A. Packaging Exposition, recently held in New York, the Container Corporation of America exhibited a packaging display built around the many wartime applications of its products.

In the accompanying illustration of the exhibit, the background of the display accents prominently the substitution of paperboard packages to permit the conversion of essential materials to war use. This theme in packaging applies to military use, as well as civilian. The black cylinders seen in the illustration pack artillery ammunition, and there are paperboard drums for lubricating grease, frozen eggs, and a heavy duty skin cleanser. Military packaging for rations, sub assemblies, replacement parts and dehydrated foods are likewise included. At the right of center is seen a paperboard target used to help develop future sharpshooters.

Four kinds of waterproof shipping containers float in the tank of water to be seen in the right center of the display. These were developed cooperatively with other manufacturers and represent a major stride forward in the technical advancement of the industry.

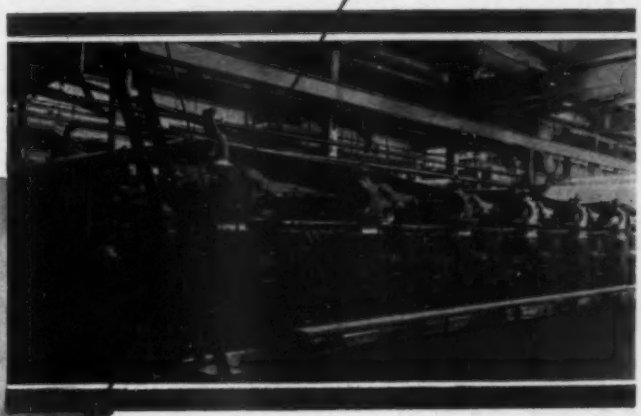


How to Lengthen Felt Life and Lower Production Costs



Lengthening valuable felt life from 50% to 200% is the remarkable service record paper manufacturers credit to Dowicide G. This product of Dow research provides the proper germicidal solution to wash felts during shutdowns and to protect them from the damaging attack of micro-organisms.

In mills where felts are subject to heavy manufacturing loads and where there are no shutdowns between felt changes, Dowicide G can be added to the system continuously. A concentration of 50 parts per million will inhibit



the growth of the organisms which shorten felt life and eliminate them as a destructive factor.

Dowicide G is only one of 17 Dowicide products which are being used in various paper manufacturing operations to prevent growth of fungi and bacteria. These modern chemical products are helping manufacturers of paper, leather, paint, lumber and many other essential products to conserve and make the most of what they have.

THE DOW CHEMICAL COMPANY, MIDLAND, MICHIGAN

New York • Chicago • St. Louis • Houston • San Francisco
Los Angeles • Seattle

OTHER USES FOR DOWICIDES: Preventing stain and decay on pulp logs; preserving lap and pulp stock; making paper products mold-resistant; protecting paper products from decay and termite attack; controlling slime conditions; reducing structural and paint maintenance costs.

DOWICIDE

GERMICIDES AND FUNGICIDES

DOW

CHEMICALS INDISPENSABLE
TO INDUSTRY AND VICTORY

WIDE CAMPAIGN IS LAUNCHED TO PROTECT NATION'S FORESTS

An intensive campaign has been launched by the American Forest Products Industries, Inc., for the purpose of awakening a nation-wide realization of the vital importance of wood. Guarding America's forests has definitely become an essential wartime occupation. In support of this movement, the organization has prepared various media to win the co-operation of the public. There are booklets, magazine and newspaper articles, posters, charts, and radio programs.

Two moving picture films also have been released. "Trees for Tomorrow" is a forest industry sound movie in two reels. Another, "Wood Goes to War," is a short film, both informative and interesting. The American Forest Products Industries, Inc., asks the public to request local moving picture theatres to show these films. There is no charge. Schools and clubs may obtain a 16 mm. sound print of "Trees for Tomorrow" for their use.

The AFPI also will donate seedling trees for replanting. Nothing is for sale, but full information may be obtained from the American Forest Products Industries, Inc., 1319 Eighteenth Street, N.W., Washington, D. C.

◆

PARSONS PAPER CO. TO USE FACILITIES IN CASE OF AIR RAID

How facilities of paper mills may be used to aid the Civilian Defense organization in the event of air raids is being demonstrated at the Parsons Paper Company, Holyoke, Massachusetts.

Charles Rieser, of the company, offered the use of parts of the mill buildings to the gas decontamination unit of the Chemical Warfare Branch of Civilian Defense. He pointed out that paper mills are ideally equipped for decontamination, the rag mills, especially, having ample supplies of bleach liquor, which is necessary for immediate first aid in gas cases. The Parsons mill also has showers and well-heated and well-lighted space for receiving and treating casualties.

The buildings already have been inspected by Edward Maher, city engineer of Holyoke, and found adequate for the purpose, and Mayor Henry J. Toepfert has initiated steps to provide necessary equipment.

Briefs . . .

▶▶▶ A NEW RECORD OF PRODUCTION was set by Great Lakes Paper Company, Ltd., Ontario, in 1942. Hon. Earl Rowe, president, announced that production came just short of 120,000 tons of newsprint and 35,000 tons of sulphite pulp. He said that woods operations have been difficult due to scarcity of labor and other factors; however, the paper mill is continuing to operate at 100 per cent capacity, and the new sulphite pulp unit, put into operation last May, has added materially to production of pulp. A new machine added last year for drying pulp has made the operation more efficient.

◆

▶▶▶ A DOCUMENT purporting to be a holograph copy of Abraham Lincoln's proclamation of April 19, 1861, declaring a state of insurrection and blockading the Southern States, has been submitted to the Carew Manufacturing Company, South Hadley Falls, Massachusetts, by the Illinois State Historical Library in an effort to determine its authenticity. The paper had a Carew watermark.

▶▶▶ BETWEEN 600,000 AND 700,000 acres of timberland on the Tobique River have been purchased by Fraser Companies, Ltd., of Edmundston, New Brunswick, from the New Brunswick Railway Company. The purchase price of the land has not been disclosed; however, the area represents about 40 per cent of the total land held by the New Brunswick Railway Company.

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▶▶▶ THE CONTROLLING INTEREST in E. B. Eddy Company, Ltd., Hull, Quebec, was transferred on April 15 from R. R. Bennett (former premier of Canada, now a resident of England) to the ownership of William Garfield Weston, Canadian born member of the British House of Commons. The announcement was made April 15 through a British press dispatch from Ottawa. Mr. Weston would not reveal the purchase price, but it was reported the amount involved ran into several million dollars.

◆

▶▶▶ THE POWER SITUATION IN CANADA has improved to such an extent that newsprint shipments to the United States should be maintained at present levels throughout this year and most of 1944 at least, according to H. J. Symington, power controller for the Canadian government, in a recent interview in New York. "Speaking solely from the viewpoint of the power situation," he said, "I should say that newspaper publishers in the United States have nothing to fear in regard to newsprint supplies until late in 1944. If other matters adjust themselves accordingly, there should be no concern even beyond that date."

◆

▶▶▶ AN APPEAL TO KEEP DOWN FIRE losses this year is being made by the Department of National Resources in Canada. Although fewer forest visitors meant fewer fires last year, the shortage of men to fight the outbreaks meant heavier losses when blazes did start. Last year's forest fire damages and costs of fighting fires were estimated at $3,550,181, against an average of $5,378,122 for the past ten years. The area burned was 1,838,471 acres against a ten-year average of 2,428,659 acres.

◆

▶▶▶ NEWSPRINT WAS A PROMINENT SUBJECT of discussion at the convention of the Association of Newspaper Publishers at New York City, April 20 to 22. The newsprint report presented to the Association advised careful study of economies in the use of newsprint. With careful use, orderly buying, and other such economies, the committee stated that no shortage is likely. The increase of $4 per ton in price was referred to while a reduction in freight rates will mean a saving of about 90 cents per ton.

◆

▶▶▶ THE MORATORIUM ACT, 1941, of the Abitibi Power and Paper Company, Toronto, will be extended another year by the Toronto Legislature this session, according to an amendment contained in the Statute Law Amendment Act, which has come before the legislature.

◆

▶▶▶ A SHUTDOWN AFFECTED 125 employees when the Joliet, Illinois, mill of the United Wall Paper Factories, Inc., closed on April 16. The plant had been operating on a full schedule. The Chicago mills of the company will continue to run.

◆

▶▶▶ PERSONS WHO FIGHT FOREST FIRES are exempted under a recent order approved by the Minister of Labor in Canada from permit and notice requirements under National Selective Service Civilian Regulations, according to an announcement by A. MacNamara, director of National Selective Service.

This Test Shows the Very Real Advantage of the CONCAVE SIDE!

What Happens When a V-Belt Bends

FIG. 1

FIG. 2

Grip the side-walls of *any* V-belt as it bends. You will *feel* its sides change shape. The top of the belt becomes narrower because it is under tension. The middle of the side-wall bulges out. You will see that a *straight-sided* V-belt must assume, when it bends, the shape shown in figure 1 (on the left)—a shape that *doesn't fit the sheave groove.*

Now try the same test with a Gates Vulco Rope. You will find that the *same shape change merely straightens* the precisely engineered Concave Side (See figure 2). There is no side-bulge. This insures uniform side-wall wear:—*longer life!* Moreover, the full side-wall of the belt uniformly grips the pulley. It therefore carries heavier loads without slipping—a saving in belts and also a saving in power.

Only belts built by Gates are built with the Concave Side, a Gates patent.

435

THE GATES RUBBER COMPANY

Engineering Offices and Stocks in All Large Industrial Centers

GATES VULCO ROPE DRIVES

CHICAGO, ILL. 549 West Washington
NEW YORK CITY 215-219 Fourth Avenue
ATLANTA, GA. 738 C. & S. National Bank Building
LOS ANGELES, CAL. 2240 East Washington Boulevard
DENVER, COLO. 999 South Broadway
DALLAS, TEXAS 2213 Griffin Street
PORTLAND, ORE. 333 N. W. 5th Avenue
SAN FRANCISCO, CAL. 1090 Bryant Street

LAST YEAR'S BONDS GOT US STARTED

THIS YEAR'S BONDS

ARE TO WIN!

★ Last year saw nearly 30,000,000 workers voluntarily buying War Bonds through some 175,000 Pay-Roll Savings Plans. And buying these War Bonds at an average rate of practically 10% of their gross pay!

This year we've got to top *all* these figures—and top them handsomely! For the swiftly accelerated purchase of War Bonds is one of the greatest services we can render to our country . . . and to our own sons . . . and our neighbors' sons. Through the mounting purchase of War Bonds we forge a more potent weapon of victory, and build stronger bulwarks for the preservation of the American way of life.

"But there's a Pay-Roll Savings Plan already running in my plant."

Sure, there is—but how long is it since *you've* done anything about it? These plans won't run without winding, any more than your watch! Check up on it today. If it doesn't show substantially more than 10% of your plant's pay-roll going into War Bonds, it needs winding!

And you're the man to wind it! Organize a vigorous drive. In just 6 days, a large airplane manufacturer increased his plant's showing from 35% of employees and 2½% of pay-roll, to 98% of employees and 12% of pay-roll. A large West Coast shipyard keeps participation jacked up to 14% of pay-roll! You can do as well, or better.

By so doing, you help your nation, you help your workers, and you also help yourself. In plant after plant, the successful working out of a Pay-Roll Savings Plan has given labor and management a common interest and a common goal. Company spirit soars. Minor misunderstandings and disputes head downward, and production swings up.

War Bonds will help us win the war, and help close the inflationary gap. And they won't stop working when victory comes! On the contrary—they will furnish a reservoir of purchasing power to help American business re-establish itself in the markets of peace. *Remember, the bond charts of today are the sales curves of tomorrow!*

You've done your bit Now do your best!

THIS SPACE IS A CONTRIBUTION TO AMERICA'S ALL-OUT WAR EFFORT BY

THE PAPER INDUSTRY AND PAPER WORLD

Norton
PULPSTONES

MILLS can depend upon a uniform steady rate of production without expensive shut downs occasioned by breakages or frequent stone replacement . . . and no apparent production loss due to decreased surface speed because the rate is very low.

WHEN IT'S AN ABRASIVE PROBLEM CALL IN NORTON ENGINEERING SERVICE

NORTON COMPANY
WORCESTER, MASS.

FOR VICTORY
BUY
UNITED
STATES
WAR
BONDS
AND
STAMPS

FROM THIS ART GREW TODAY'S PRODUCTION PAPER MILL

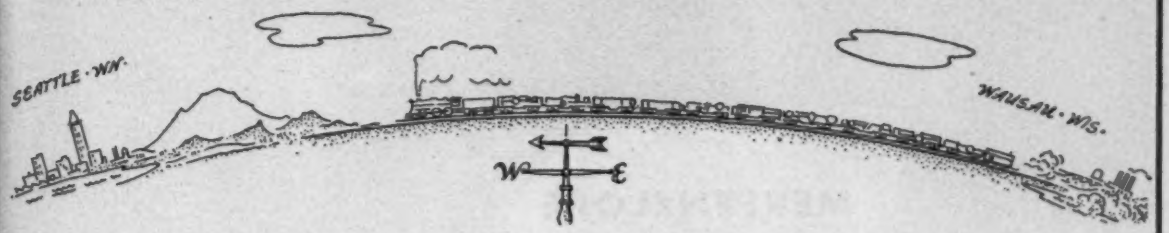
In 1689 it was the art of paper making—production limited to the individual effort of the paper maker. From this art grew today's modern production paper mill where tons are produced faster than the early paper maker produced sheets. But, even he used felt layers to remove water from the sheets, put between felt layers and pressed. Today felts are as important as then, having kept pace with paper making. Since 1890 Appleton Felts have met all requirements of paper mill production, year after year.

make APPLETON FELTS good paper

This advertisement is a continuation of a series started in 1940 depicting early history of paper making.

Appleton Woolen Mills

APPLETON • WISCONSIN



PULP BLEACHING MOVES WEST...

and Acquires New Associates

REORGANIZATION of Pulp Bleaching Company and its association with Webster-Brinkley Co., Seattle, brings into combination a unique background of process experience, modernized manufacturing facilities, and a war-proven capacity to engineer tough jobs and get them done in a hurry.

Pulp Bleaching Company, formerly of Wausau, Wisconsin, has been the leading specialist in equipment for cellulose purification and related processes for the past twenty years. It has made installations in seven countries, having a capacity of over 10,000 tons per day, handling every type of fibre from which pulp is made. All of the present United States supply of wood cellulose for explosives, and a large part of the British Empire supply, is made in equipment designed and built by this Company.

Raymond P. Hill, sole owner of Pulp Bleaching Company since 1933, has now associated with himself in the ownership George Gunn, Jr., President of Webster-Brinkley Co., Seattle, and Thomas J. Bannan, Vice-President of Webster-Brinkley Co. and Executive Vice-President of Western Gear Works, Seattle and Los Angeles, Pacific Gear & Tool Works, San Francisco, and Pacific Gear Works, Los Angeles.

When we have won the war, Webster-Brinkley Co. will manufacture for Pulp Bleaching its expanded line of process equipment. For the duration, every effort will be made to supply necessary replacement parts to users of Pulp Bleaching equipment having adequate priority status.

Webster-Brinkley Co. has made an outstanding record in handling a number of tough, critical war jobs with impossibly short delivery schedules and has been awarded both the Maritime "M" and the Army-Navy "E". They were recently entrusted with the design of a special type of steering gear for combat ships not previously made in this country, and have made many other notable engineering contributions to the war program.

These combined resources, sharpened and toughened by our war effort, will be available to the pulp industry when Peace comes. Perhaps, you have a problem you would like to have us begin thinking about, even though its execution may have to go on the waiting list.

PULP BLEACHING COMPANY

651 Alaska Street • Seattle, Washington

MAIL ADDRESS: P. O. BOX 3127

MERFENELOPE
Slime Chaser

In a one-ounce sealed envelope. Throw it in the beater unopened

Cleans Pipes
Kills Bacteria
Reduces Washups
Fewer Slime Rejects

R. T. VANDERBILT CO., INC.
230 Park Avenue, New York City

. . . . . Editorial . . . . . .

Critical Period for Pulp and Paper

▶▶▶ SLOWLY, BUT SURELY, the production of pulp and paper products is approaching an era of curtailed operations. As forecast in this column months ago, the operations of the mills of the industry would be controlled by the amount of pulpwood available. As the supply of pulpwood diminished, the output of wood pulp and paper would decline.

Now, the War Production Board has just announced that the supply of unbleached kraft pulp is about 20,000 tons short of that necessary to provide mills with a thirty-day inventory, which has been the basis of pulp allocation for the past year.

Beginning June 1, the allocations of unbleached kraft pulp will be upon the basis of twenty days' inventory, and that further restrictive action must be taken to insure manufacturers of sufficient paper and paper board to meet essential demands. It is also likely that the "withholding clause" of order No. M-93 (under which producers may be required to set aside and hold portions of pulp output for directed disposal of the War Production Board, may become effective. The present critical situation between supply and demand for essential paper and pulp products will become progressively more critical as the season advances.

There are no ameliorating influences to be anticipated because the basis of the shortage stems from the fact that 1,615,000 men have left the farms and forests to enter other more remunerative divisions of production, and also were in the earlier stages of the draft taken into the armed forces. None of these men will be returned to the farms and forests for the duration of the War. In addition, the production of pulpwood will be further handicapped by such things as shortage of transportation, lack of trucks, tires and manpower to operate them.

Who is going to operate—and on what basis? Manifestly, the only basis of allotment of pulp should be upon the basis of essential uses. Those mills supplying the essential war and civilian demands should and must be kept operating.

Our belief is that the only way in which to properly determine these essential producers is for the War Production Board to require all mills to report monthly the end-uses of all products made by them. This would provide the Allocation Committee with the necessary basic data upon which to make the necessary allotments. There is no such basis in vogue now. There should be no delay in setting up such a system, because from our experience and analysis, there is no other such an effective and fair a system for adoption. The paper industry is facing a crisis. That crisis has been coming slowly, but surely. Today, it is rapidly approaching a showdown. The latest action of the War Production Board, as cited above, is evidence of its criticalness.

Have Faith in the Future

▶▶▶ IN THESE DAYS, when the entire world is troubled with War, it is difficult to dream of tomorrow and of peacetime living again. So many individuals in every walk of life are saying that it is impossible to plan any more; that everything is uncertain; that the whole world is topsy-turvy; and that it is difficult enough to go along from day to day without the added burden of giving thought to the future.

There always have been people who for one reason or another have thought those same thoughts. The future to some is always dark. They fail to see in it the birth of a new day, the opportunity to do good, the possibility of a better and happier world.

Some months ago, for example, the splendid house organ of the Rice Barton Corporation, *The High Road*, published a brief item that included individual statements of five famous personages in history. The author of the item was unable to furnish the name of the person who assembled the statements, it being unknown to him. The statements, however, bear repeating. Here they are with due credit to the original compiler and to anyone else who has aided in getting wider distribution of them:

In 1801, Wilberforce declared: "I dare not marry, the future is so unsettled."

In 1806, William Pitt said: "There is scarcely anything longer but ruins and despair."

In 1848, Lord Shaftsbury said: "Nothing can save the British Empire from shipwreck."

In 1849, Disraeli declared: "In industry, commerce and agriculture there is no hope."

In 1852, the dying Wellington declared: "Thank God I shall be spared from seeing the consummation of ruins that is going on about us."

In spite of such remarks by well-meaning and brilliant men, the world has forged ahead. There has been progress — much progress — and the possibilities of future progress are limitless.

Now is the time, if ever there was a time, when personal perspectives must remain fluid. Clear-cut objectives must be forged out of the maelstrom and confusion of thought that exists today. Everyone realizes that the one big job of the moment is that of winning the War which also means winning the peace. In winning the peace, it will be necessary for many adjustments to be made by individuals, by business, and by industry; but to make them with least possible economic upheaval demands an effective planning program. It is necessary for every individual firm to get down to brass tacks, to study its present problems in relation to postwar activity and to determine some course of action when its business must function on a peacetime basis again.

The whole program can be crystallized in just a few words of Longfellow. They are:

Let us, then be up and doing,
With a heart for any fate;
Still achieving, still pursuing,
Learn to labour and to wait.

Lend Lease Works Both Ways

▸▸▸ ONE OF THE THINGS we are fighting for is freedom of speech and certainly that is one of the things that needs to be preserved. But freedom of speech very frequently leads to running off at the mouth without the benefit of thought. Currently one of the topics of conversation which frequently gives listeners the realization that the speaker is without benefit of thought is this matter of Lend Lease. Criticism of the Lend Lease can be heard in almost every barbershop, restaurant, or Pullman car smoking room, and often the critic's points are such things as: "America is supporting the world" — "Everything is going out"—"America gives but doesn't receive"—"We are buying victory with American food"—etc., etc.

Let us look at the facts. Let's see if "Everything is going out." As a matter of fact that idea is particularly fallacious and more especially in the matter of food supplies. Last year American farmers and food processors turned out far more food supplies than they did even in the record year of 1941, and yet of this all-time high of production, 7 per cent went to our armed forces and less than 6 per cent to Lend Lease. These percentages may be surprising, but let's break them down into a couple of individual food items. Let's take the matter of butter, for instance. It is doubtless true that a good many of my readers have had some difficulty in getting a normal supply of butter. It might easily be true also that some of my readers have blamed this lack of butter largely on Lend Lease. But according to the Division of Food Distribution of the Department of Agriculture, less than 4/5 of 1 per cent of our butter supply was Lend Leased abroad.

In the matter of meat, about 6 per cent of our domestic supply went to Lend Lease in 1942—and this was almost entirely pork, practically none of it beef.

Perhaps some of the most vital fighting foods is contained in cans whether it be for our armed forces now in training or those abroad. Canned food is becoming more and more scarce. Yet behind this fact less than 1 per cent of our canned vegetables was shipped to our Allies last year and less than 2 per cent of our canned fruits and juices went to Lend Lease.

Nothing coming in? Well, let's see how hollow that assumption is. To do this we will go back to the Department of Agriculture and get figures like these:

Australia has a population of about 7 million people, and yet this not overly rich country sent nearly 2 million dozen eggs to the American forces in the Solomons, New Guinea and Caledonia last year. They also provided us with nearly 27 million pounds of meat, 5½ million quarts of milk, and over 20 million pounds of potatoes. That is a rather creditable showing for a relatively poor and rather undersized country.

This matter of supply and demand, giving and taking, is apt to be very illusory. We are prone to exaggerate our gifts and to minimize our receipts. We are also prone to look at gifts and receipts as the sole cause for shortages or abundances and forget other underlying affecting factors which might easily be of far greater influence.

For instance, in the latter part of 1942 there developed in some sections of the country a rather acute shortage of meat. Particularly in coast cities was it difficult to get adequate meat supplies. And yet 1942 showed a meat production of almost 22 million pounds as against 19½ million in 1941 and an average of 16½ million pounds during the period of 1935-1939. While it is true that America has been shipping approximately 6 per cent of her meat supply under Lend Lease—and our own armed forces are taking a little more than 9 per cent — we still have left here at home a trifle more than 140 pounds of meat per capita. Back in 1935-1939, we had only about 120 pounds per capita. Yet today there are shortages, and in former years there were no shortages.

Why is that? Because during the period of 1935-1939 we had far less money in our pockets, and we didn't buy so much. Last year, even though there was a lot more meat to go around, we had purchasing power of such a degree that even the increased supply of meat resulted in a shortage.

Surely it must be clear that this nation or any other nation can never produce enough for all of the people to buy everything they want—providing they have the money with which to buy it. Let's not mix logic with politics or supplant constructive thinking with mere criticism.

In bearing our fair share of the war burden, we should also remember that particularly in the matter of food stuffs some kinds will keep and ship far better than others. With an acute shortage of shipping space and a distressing submarine menace, this means that we, back on the home front, will probably have to make adjustments in our diets. We may have to go without the foods that will ship and will have to make up for that lack with other more bulky or more perishable foods.

That each may do his part, not only for victory abroad but for the assurance of our future domestic food supply, here are a few suggestions:

Study foods so that you may know their nutritive value. Plan meals from such available foods for a balanced diet.

Don't criticize the grocer. He is in the foremost ranks of the people who are having tough sledding right now.

Avoid black markets. Anyone who offers rationed articles without proper stamp collection is as much an enemy to America as the worst Jap, German, or Italian ever born.

Don't waste food. The amount of food we normally waste would keep a Chinese alive, so at least for the duration cancel out the American characteristic of prodigalness and be thrifty.

Use seasonable foods. When local crops come in, make use of them.

Plant a Victory garden. A Victory garden today saves a ration book tomorrow. Can your Victory garden produce—and can all you can.

Spend your vacation working on a farm or in a food processing plant. Such work is a very vital part to the war effort.

Refuse to hoard — whether it is sugar, shoes, or shirts. A cellar full of food supplies and a closet full of clothes won't do you any good if Hitler gets in. And hoarding is a good way to invite him in.

THE LONG-LIFE COMBINATION

PROMAL CHAINS and FLINT-RIM Sprocket Wheels

● Long after ordinary cast ferrous chain completes its normal span of service, a Promal chain usually works on and on, even though subject to adverse conditions.

Promal chains are tough under shock and strain; they are hard in the face of abrasion; they have great strength in proportion to weight and bulk.

Where the work is hard on ordinary chains, Promal chains will give you longer, lower-cost service—more dependable operation—deferred replacement needs.

Flint-Rim Sprocket Wheels resist abrasion and will last several times as long as gray iron wheels. They have fully demonstrated that they are the most durable and satisfactory cast tooth type of sprocket wheels.

For best results use them both in combination on your elevators, conveyors and slow speed drives.

LINK-BELT COMPANY

Chicago Indianapolis Philadelphia Atlanta Dallas San Francisco
Detroit Boston Los Angeles Seattle Portland, Ore. Toronto

Other offices and distributors in principal cities

TOMORROW IS TOO LATE—BUY THAT WAR BOND TODAY

LINK-BELT
CHAINS AND SPROCKETS
For Conveying and Mechanical Power Transmission

we have gone beyond paper to..

CONTROL OF AIR—FOR WAR WORK PROCESSING

We have enlisted! The knowledge, experience and facilities that enabled us to solve so many air handling problems for paper mills and metal plants are now at work helping to speed up production in vital war work.

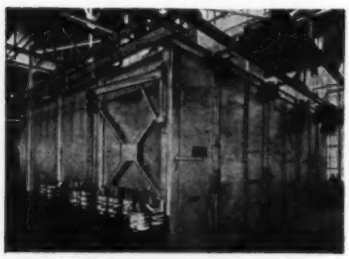
Building essential work systems for materials and parts so urgently needed for Airplane and Ammunition, Ships and Steel, Motors and Metals, Foundries and Food is the biggest job we have ever tackled—but we are doing it—working around the clock.

Our services are still available to paper mills that require equipment for producing high priority war work. Our engineering help is still gladly offered to our other old customers in their post-war development work. We confidently intend that the added experience being gained through our war work will in turn be of real benefit to the paper industry in improving future peacetime production.

BUY MORE WAR BONDS
COLLECT MORE SCRAP
CONSERVE MATERIALS

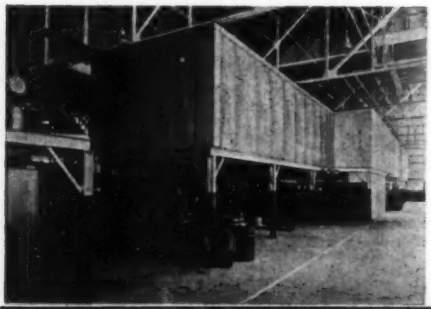
We're "all-out" for Victory. All Ross Workers are giving liberally of their skill, time —and money. Not 99% but 100% of all of our employees in offices and shops are purchasing War Bonds amounting to not 10% but more than 10% of our entire payroll.

Ross Controlled Humidity Batch Type Dryer for Chemicals



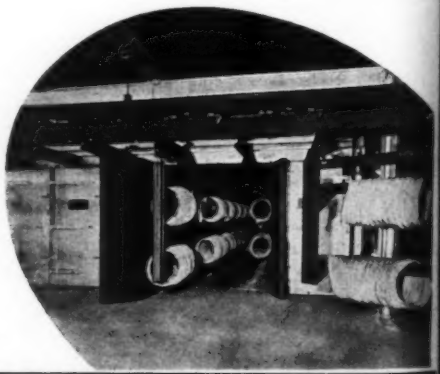
Baking Motor Armatures in a Ross Compartment Oven

Continuous Oven Heat Treating Magnesium Parts



Ross Oven Baking Wire before drawing →

← Ross Continuous Oven baking Magnesium Cores such as are used in making airplane engine parts



J. O. ROSS ENGINEERING CORPORATION

Main Office — 350 MADISON AVE., New York, N. Y.

CHICAGO—201 North Wells Street

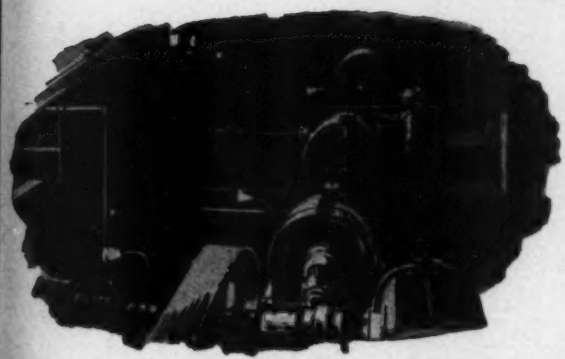
DETROIT—12953 Greeley Avenue

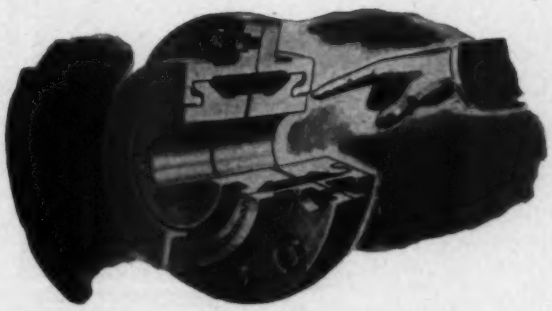
ROSS ENGINEERING OF CANADA, LIMITED, Dominion Square Building, Montreal

Trying times call for time-tried materials

...and KOPPERS provides it!

Couplings





In these days of man-power and material shortages, the engineered-in dependability of Fast's Couplings is more important than ever. Their reputation, earned over a long period of years, for lasting as long as the connected machines, has saved a lot of headaches for paper-mill maintenance men.

The unusual service-capacity of Fast's Couplings is the direct result of exclusive design features. The load carrying surfaces are protected by a positive film of oil, kept permanently clean by rocking bearings. These bearings make precise metal-to-metal contact, forming dust and moisture-proof seals.

Roofing

Koppers Coal Tar Products "keep your powder dry"—In concrete "igloos" covered with ground, the Army keeps its powder dry and safe from enemy eyes. This is fine for the powder but hard on concrete. To protect the concrete and exclude water, many of these igloos are sealed in watertight "blankets" of Koppers coal tar pitch and tar-saturated fabric and felt.

More roofing products may soon be available for non-war use—Many of the biggest wartime building projects are well along toward completion. More coal tar pitch roofing may soon be available. This will be good news for anyone who has roofing work to be done, because coal tar pitch and tar-saturated felt are such long-lasting materials.

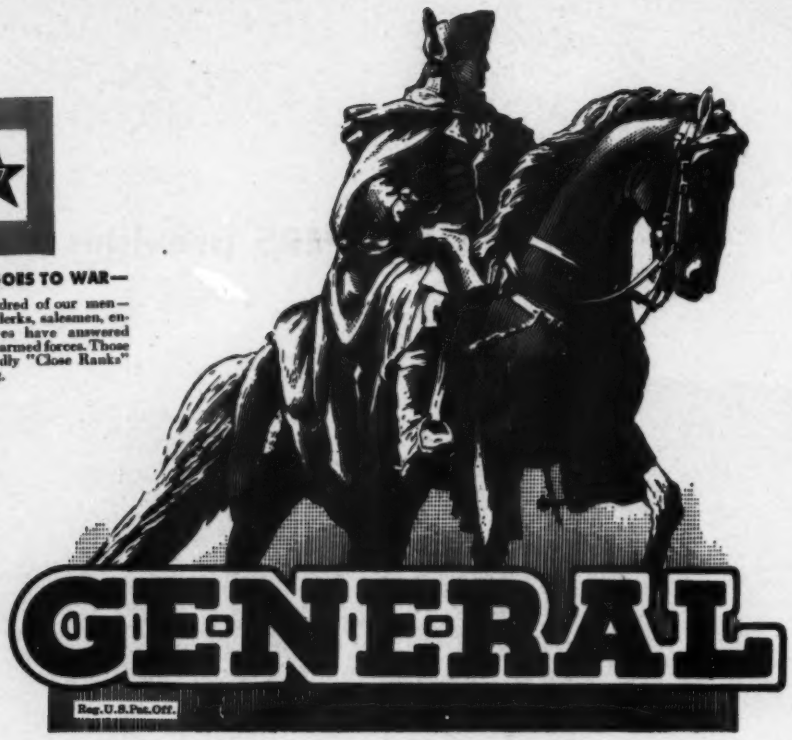
Koppers Company and Affiliates, Pittsburgh, Pa.

KOPPERS

THE INDUSTRY THAT SERVES ALL INDUSTRY

GENERAL COAL GOES TO WAR—

More than nine hundred of our men—miners, machinists, clerks, salesmen, engineers and executives have answered the call to serve in the armed forces. Those of us left behind gladly "Close Ranks" to *keep the coal rolling.*



GENERAL

Reg. U.S. Pat. Off.

RODA — High grade gas, by-product and steam coal from Wise County, Va., on the Interstate Railroad.

DENDRON — High grade gas, by-product, steam and domestic coal from Wise County, Va., on the Interstate Railroad.

STONEGA — High grade, high volatile steam and by-product coal from Wise County, Va., on the Interstate Railroad.

PREMIX — A laboratory controlled product blended to meet exacting stoker requirements. From Wise County, Va., on the Interstate Railroad.

COKE — Roda and Stonega from Wise County, Va., and Connellsville Coke from Pennsylvania.

CRITERION COAL — High grade gas, by-product, steam and domestic coal—Pittsburgh seam from Irwin Basin, Westmoreland County, Pennsylvania, on the Penna. Railroad.

CROZER — Genuine Third Vein Pocahontas from McDowell County, W. Va., on the Norfolk & Western Railroad.

Admiralty Coal — Genuine New River Smokeless, Beckley or Sewell seam from Raleigh County, W. Va., C. & O. and Virginian Railroads.

Old Kentucky — Hazard No. 4 and No. 7 steam and domestic coal from Wiscoal, Knott County, Kentucky, on the L. & N. Railroad.

GENCO — Steam and domestic coals from a number of producing districts.

ANTHRACITE — Premium and standard qualities in the entire range of Anthracite burning characteristics.

Capable engineering personnel and the experience gained through long and varied marketing activity assures proper application of one of the above brands and effective servicing of any fuel requirement.

General Coal Company

123 SOUTH BROAD STREET . . . . . PHILADELPHIA, PA.

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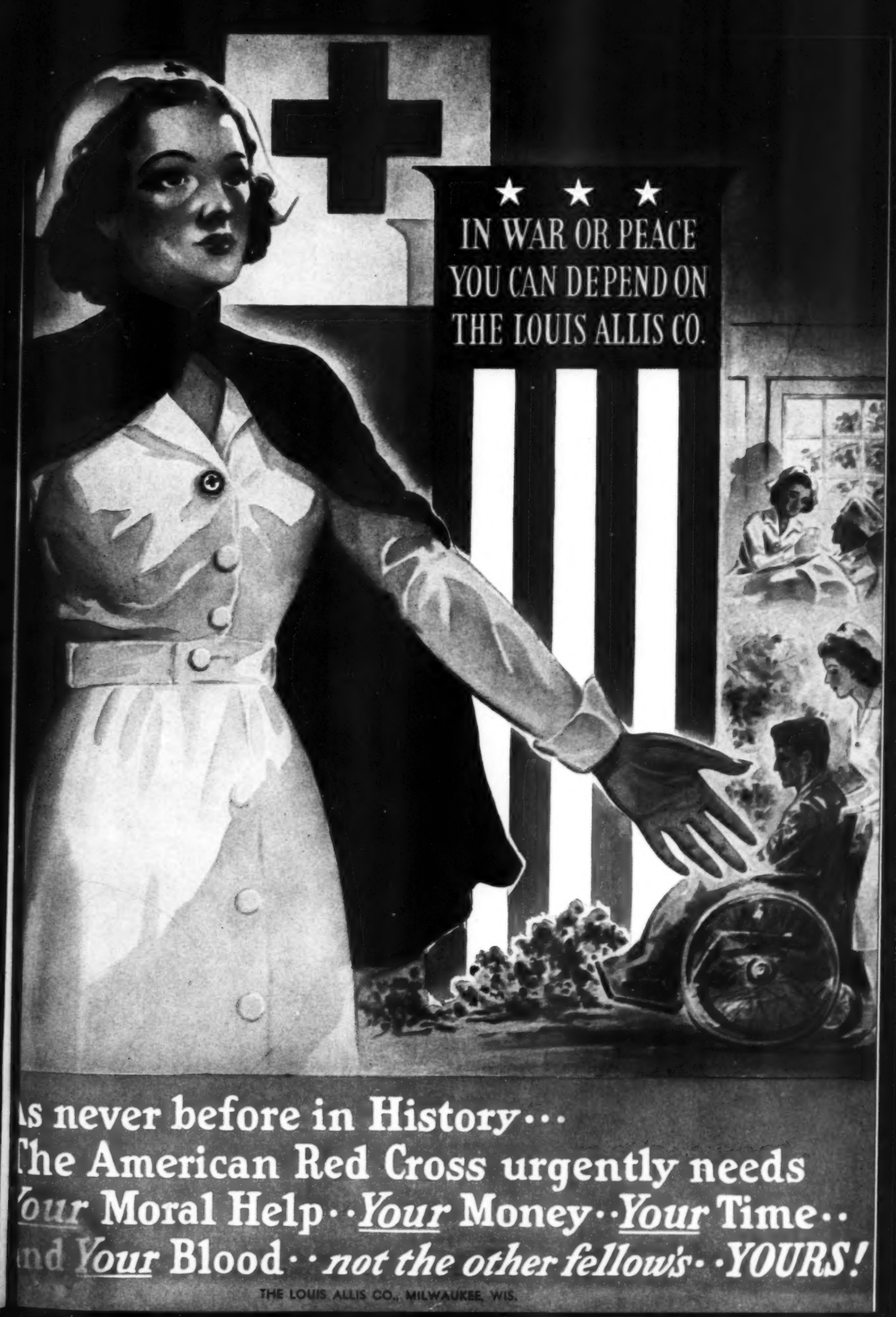
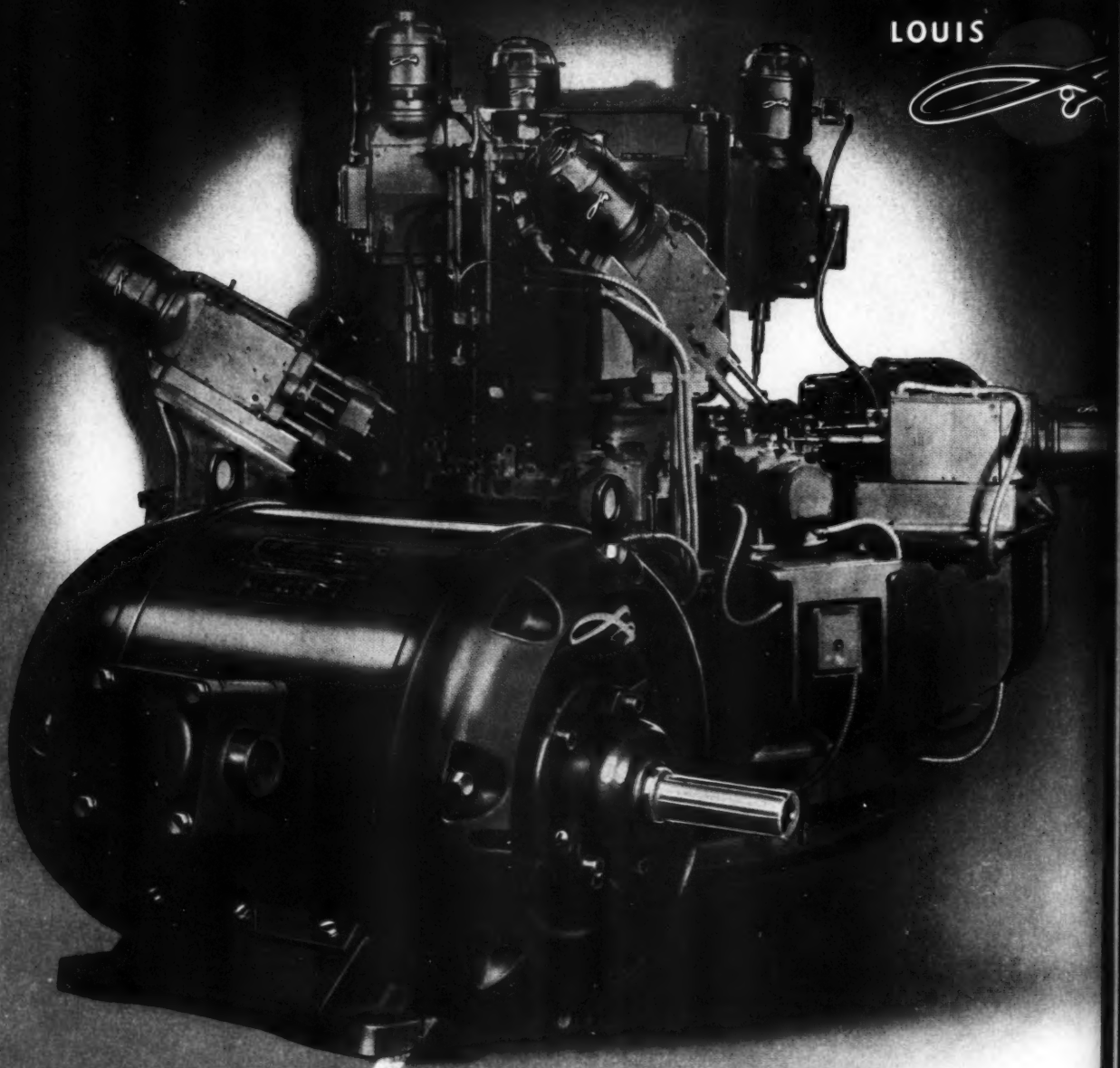

★ ★ ★
IN WAR OR PEACE
YOU CAN DEPEND ON
THE LOUIS ALLIS CO.
As never before in History···
The American Red Cross urgently needs
Your Moral Help··Your Money··Your Time··
and Your Blood··not the other fellow's··YOURS!
THE LOUIS ALLIS CO., MILWAUKEE, WIS.

LOUIS



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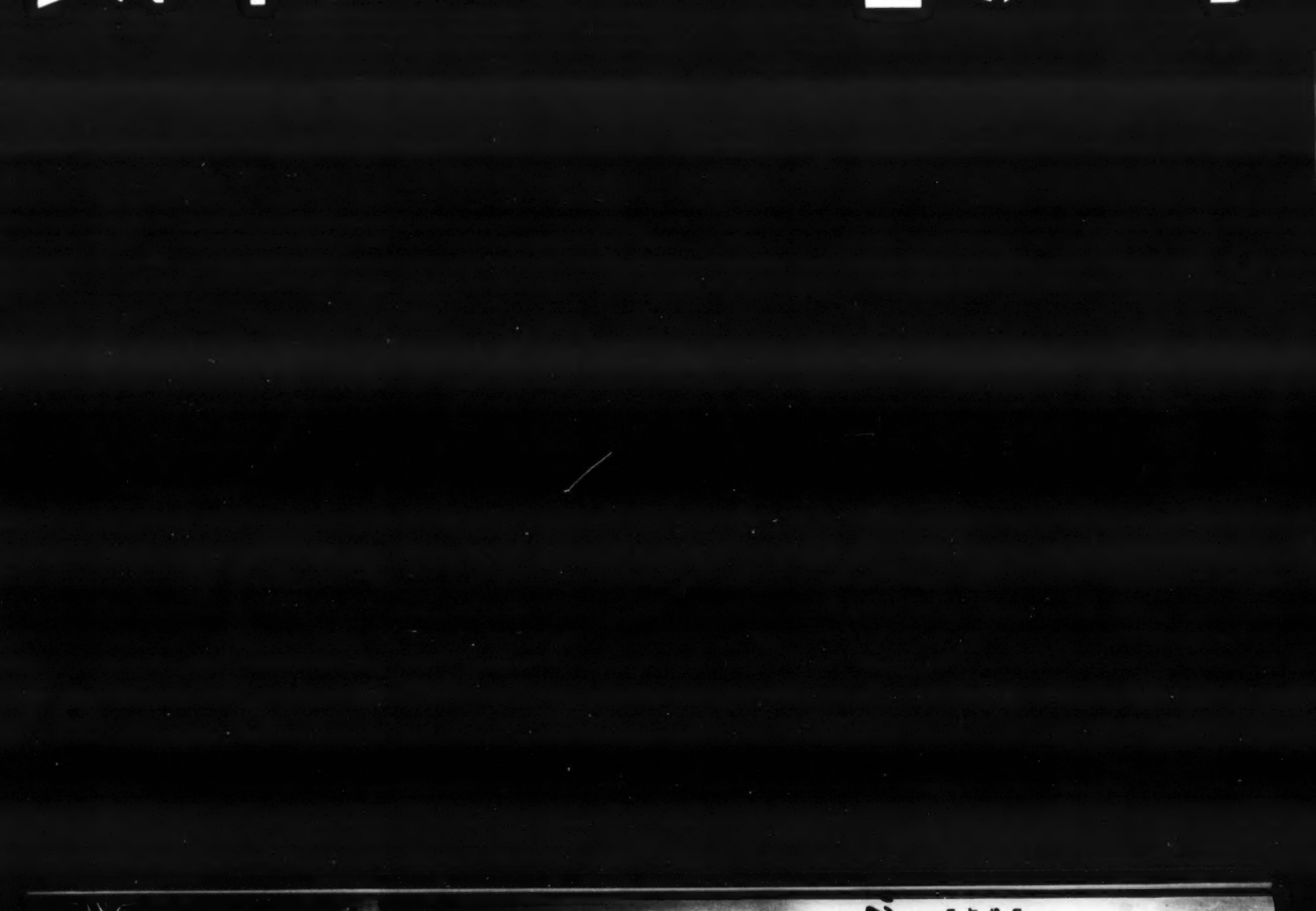

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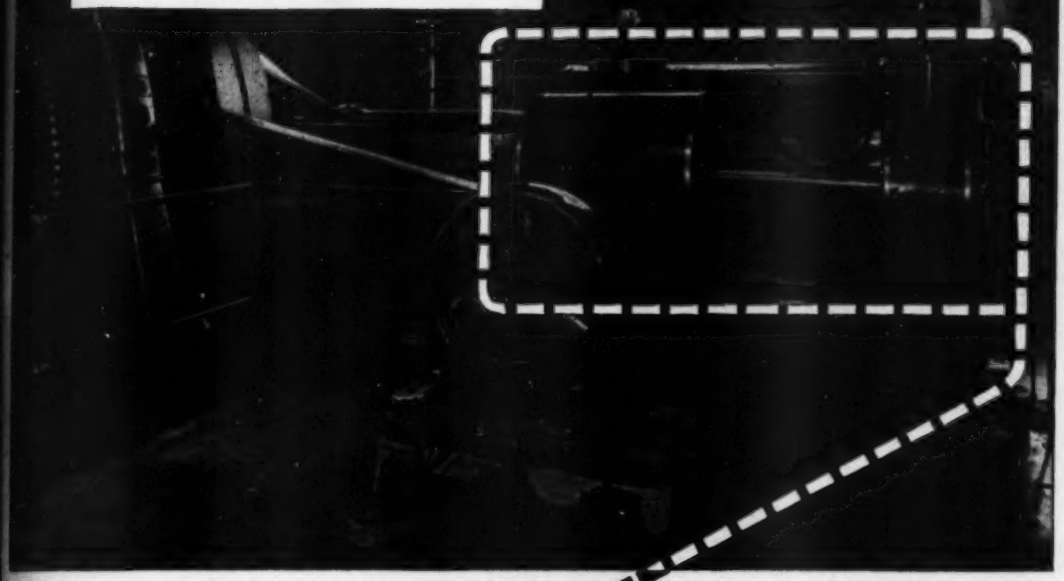

Assure needed power for war loads

THERE's little stirring military action about the plants pictured here. But the extra power to produce the machines of war must come from plants just like these, and yours. That power must not fail for any reason—particularly not from improper care or lubrication, because it is so simple to make sure that lubrication is not the cause.

You can't make a better first step than to reexamine your whole problem of steam engine lubrication—your lubricants and lubricating methods. See where they might be affected by the new demands on equipment—the longer hours of operation, and heavier loads. Look at consumption records, for example. Increased consumption may indicate increased wear.

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If you don't already know the Standard Oil Engineer in your locality, call the nearest Standard Oil (Indiana) office, or write 910 South Michigan Avenue, Chicago, Illinois, and ask to have a Lubrication Engineer stop at your plant.

Since the last war when the 200 H.P. engine (above) was switched to a Standard steam cylinder oil, operation has been almost continuous, with little or no maintenance. The cylinder has never been rebored and rings have been replaced only once.

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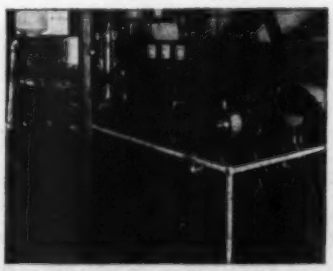

Millwork for defense housing is this plant's job. An analysis of steam pressures and loads, and a thorough check of feeds for adequate cylinder and valve lubrication led to a recommendation of Stanocyl Cylinder Oil. This has kept this engine free from all lubricating trouble.

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Fungicides and Germicides
in the Pulp and Paper Industry

D. K. BALLMAN[1] and DR. F. B. SMITH[2]

▸▸▸ BACTERIOLOGICAL AND mycological control is needed in the paper industry probably more than in any other industry. From the original raw material—the trees in the woods—through the many steps in manufacturing until finished paper is produced, the activity of bacteria and fungi may result in odor, color, spoilage, loss of stock, loss of production, slime, and mold growth on finished products.

This discussion deals primarily with a group of chemicals known to the trade as Dowicide (Trademark registered U. S. Pat. Office), which comprise various phenols, halogenated phenols and their salts. The fact that there are so many different compounds in this group illustrates one of the basic principles of industrial bacteriology in that no one chemical has ever been found that is a panacea for controlling the hundreds of thousands of different species of microorganisms which give rise to difficulties in the paper and other industries. Considerations of solubility, vapor pressure, inhibiting and killing efficiencies, odor, toxicity, and cost are all individual factors entering into the selection of the proper compound to use. These can be best illustrated by citing actual uses of the Dowicides in the paper industry.

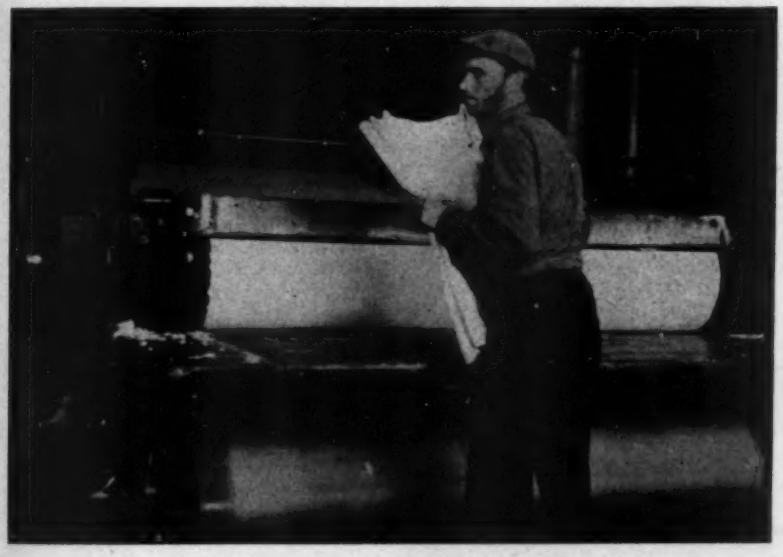


Fig. 1—Application of Dowicide on wet press.

Prevention of Stain and Rot on Pulp Logs

Pulp logs are now treated to prevent sap stain and deterioration caused by dry rot while in storage prior to being manufactured into pulp.

This operation is an old one to the lumber industry, but relatively new to the paper industry. Practically all wood is susceptible to attack by certain microorganisms (Table I) which feed on the sap and which cause progressive discoloration called sap stain. This stain is dye-like and since it is difficult to remove in pulping operations, it may effect a reduction in brightness of the unbleached pulp. Prevention of the stain by dipping the logs in 1.0 per cent solutions of Dowicide G or S will not only eliminate this problem but will also decrease any loss of cellulosic material due to the action of the so-called "dry rot" organisms (Table I) on the logs while in storage. It is important to remember that this process of treating is effective only where logs can be treated immediately after cutting in the woods. While this simple chemical treatment will prevent the formation of sap stain it will not, on the other hand, remove any sap stain discoloration already present. A number of Southern mills which control their log sources are treating with excellent results.

Preservation of Lap Pulp Stock

No one who has seen the black nodular growth on pulp that has been in storage will question the necessity of treating lap stock. It is natural that such stock will readily mold even at low temperatures, since the moisture content is more than sufficient to germinate the spores and accelerate the development of the mycelia.

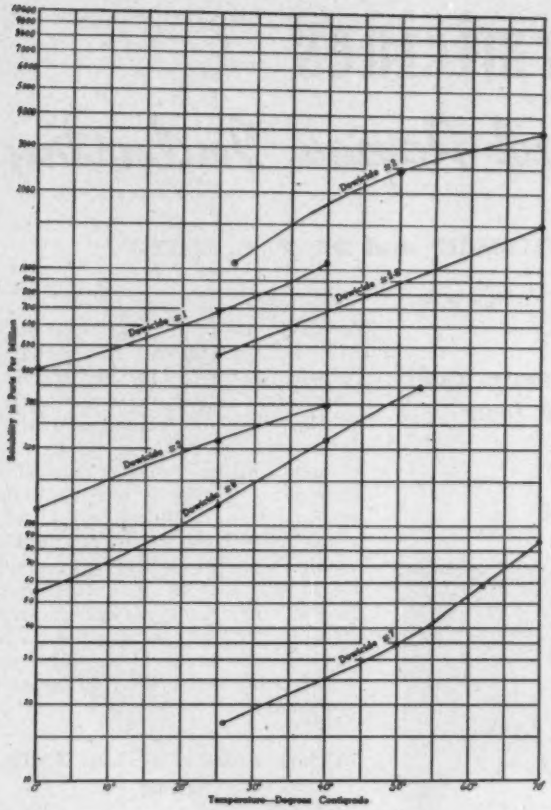
The treatment of lap stock can best be performed at the wet press where a solution of Dowicide F is sprayed on the sheet. Dowicide F (Sodium Tetrachlorophenate) is water soluble, but on contact with the pulp is precipitated as the free phenol, in which form it is water insoluble and is, therefore, held by the pulp. This conversion to the free phenol is effected by reason of the slight acidity of the pulp sheet.

The phenol form (as will be noted from Figures 2 and 3) has very low water solubility and vapor pressure. Our tests have shown these characteristics to be of sufficient magnitude

TABLE I

Microorganisms	"Dry Rot" Organisms
Ceratostomella pilifera	*Lenzites trabea*
Ceratostomella ips	*Lenzites saepiaria*
Ceratostomella pluriannulata	*Poria incrassata*
Endoconidiophora coerulescens	*Merulius sp.*
Endoconidiphora moniliformis	*Fomes annosus*
Graphium rigidum	*Fomes roseus*
Diplodia sp.	*Stereum sanguinolentum*
Diplodia natalensis	*Polystictus abietinus*
	Trametes pini

[1] (1) Director of Technical Service and Development, (2) Technical Service Division, The Dow Chemical Company.



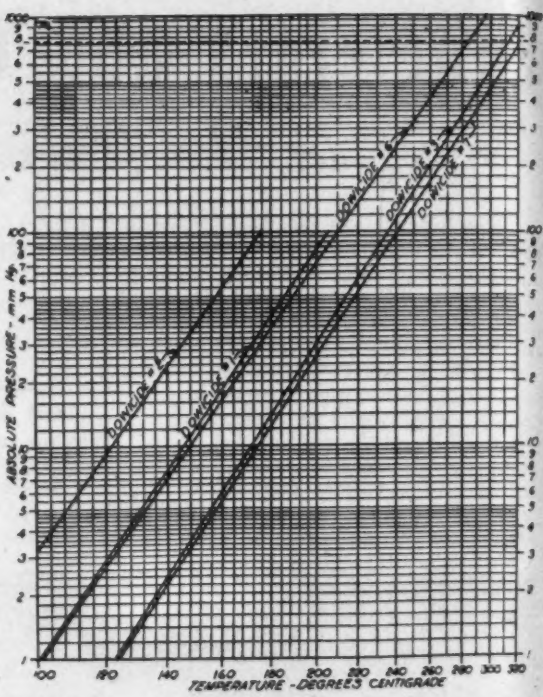


Fig. 2 (left)—Solubility of various Dowicides in water. Fig. 3 (right)—Vapor pressure of various Dowicides. Dowicide No. 1—Orthophenylphenol. Dowicide No. 2—2, 4, 5—Trichlorophenol. Dowicide No. 2a—2, 4, 6—Trichlorophenol. Dowicide No. 3—Chloro-2-Phenylphenol. Dowicide No. 6—2, 3, 4, 6—Tetrachlorophenol. Technical. Dowicide No. 7—Pentachlorophenol. Technical.

to chemically inhibit mold growth throughout the layers of the stock by reason of mycostatic vapor action and solubility in water. If odor is an important consideration, Dowicide G (Sodium Pentachlorophenate) should be used. While this material is not quite as effective a fungicide for this use, its presence in slightly higher quantities will prevent mold growth and stock will be free from residual chemical odor. Due to the low vapor pressure of Pentachlorophenol (Dowicide 7), preservation is of a more permanent nature.

Before leaving the subject of pulp preservation, it should be mentioned that pulp souring in the system over shutdown periods is a result of the action of certain bacteria and mold organisms. Preservation may, in most cases, be obtained by the addition of two pounds of Dowicide G per ton of pulp. This is particularly important in the case of colored stocks where the action of microorganisms will cause a change in *p*H of the system sometimes resulting in changes in shade of the dyestuff.

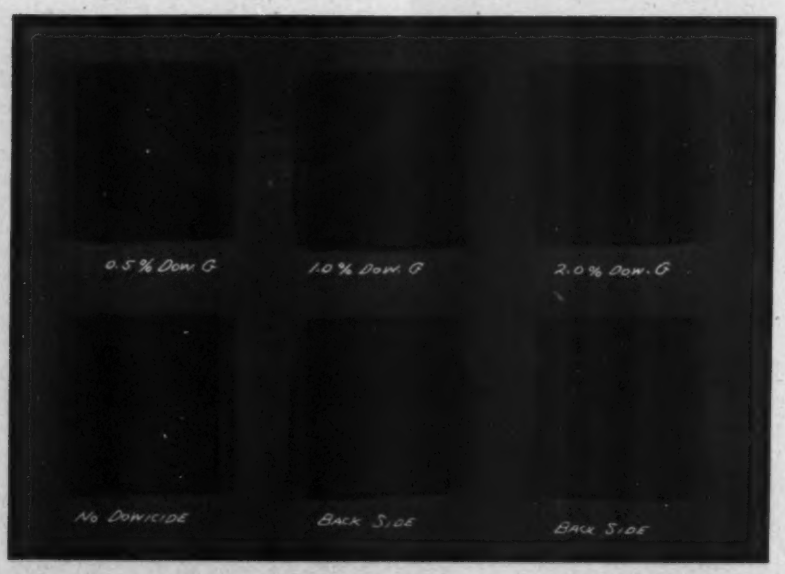


Fig. 4—The effect of introducing Dowicide G into adhesive solutions to produce mold resistance in corrugated board.

Extension of Felt Life

In 1939, Dr. John P. Weidner, of Hoberg Paper Mills, Inc., (*Paper Tr. J.* 110, No. 19, 36-8, 1940) started a research program designed to find the reason for loss of felt life. It was determined that certain types of bacteria are the cause of felt destruction. These particular organisms are present in nearly all paper mill water systems and may under favorable conditions develop to such an extent as to cause a breakdown of the woolen fibers of the felts (L. McGrath, *Paper Ind.* 18, No. 4, 281-4, 1936).

The use of Dowicide G as a germicidal solution to wash felts during shutdowns has proven an effective means of increasing felt life. A solution of two to four pounds of Dowicide G in fifty gallons of water is thrown onto the felts at the entering side of the press in such a manner that

a pool of liquid forms behind the press and both felts become thoroughly saturated. An increase in wet felt life of ten to fifteen per cent and as high as forty to sixty per cent can be expected, while for top or pick-up felts, the increase may be ten to one hundred per cent depending on the actual mill conditions. For a machine having a 132-inch wire, two pounds of Dowicide G is sufficient for one felt and two to four pounds for two felts.

This, however, is not the entire answer for those mills where felts are subject to heavy manufacturing loads and where there are few shutdowns between felt changes. Although felt life is short in such mills, it may be extended by the use of a germicide. Some manufacturers of heavy board from waste stock have found it advisable to add the Dowicide to the system continuously and thus obtain a bacteriostatic effect. The concentration of 50 parts per million will not necessarily kill the organisms, but will inhibit their growth to the extent that they no longer constitute a destructive factor on felts. The extension of 50 to 200 per cent in felt life has resulted from such treatments in commercial practice.

Slime Control

Slime control is a subject of interest to almost every paper manufacturer and would require pages of discussion to cover thoroughly. Inasmuch as this paper is concerned primarily with the chlorinated phenols, their development in this field will be briefly outlined.

As early as 1931, the laboratories of The Dow Chemical Company had shown that the chlorinated phenols as a class of compounds possessed unusual efficiency in inhibiting the growth of microorganisms. As one phase of this development, full-sized commercial tests were run, and results showed that in connection with slime control sodium pentachlorphenate could be used economically and successfully.

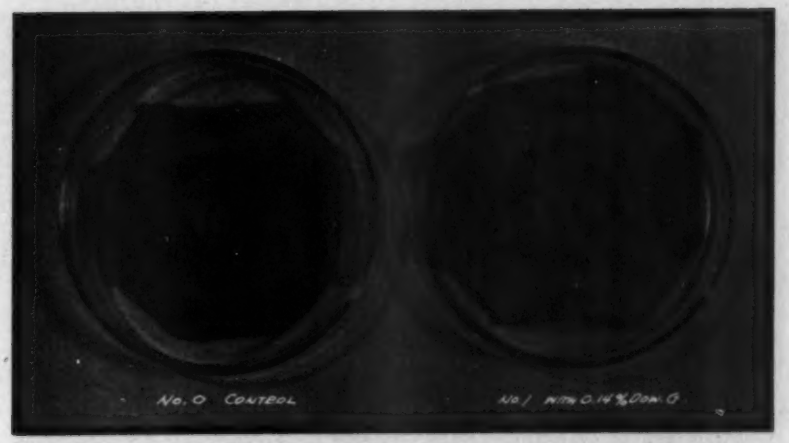


Fig. 5—Treated and untreated egg case fillers photographed after incubation for 70 days at high humidity.

Commercial use, of course, always discloses many factors not brought to light by laboratory tests and it was in these commercial runs that a full realization of the complexity of the slime control problem became apparent. On the basis of further experimental work in this field, it has been found that the development of slime in paper mill systems is due primarily to the growth of three different types of organisms; namely, algae, slime-forming molds, and slime-forming bacteria. Thus, it is obvious that no one algaecide, fungicide, or germicide can be the complete answer.

Research work in this field is now directed toward the selection of chemicals having a specific action against the many types of organisms that are present in paper mill water systems. Problems caused by slime mold can usually be solved by sodium pentachlorphenate as the active toxic agent, but the majority of slime problems will require a balanced combination of toxicants capable of exerting an inhibitory or killing action against the three types of organisms that have been mentioned.

Preserving Nonfibrous Raw Materials

Although this discussion deals primarily with the preservation of cellulosic materials, there are other papermaking raw materials such as starch, glue, casein, alpha protein, etc., which are also subject to decomposition. It is here that the diversified

TABLE II—The Mycostatic Powers of Five Phenol Derivatives on Four Genera of Molds.

Mycostat	Test organism	Per cent concentration of mycostat													
		.2	.04	.03	.02	.009	.008	.007	.006	.005	.004	.003	.002	.001	Control
Sodium orthophenylphenate (Dowicide A)	*Aspergillus niger*	—	—	—	—	?	?	?	?	3+	3+	3+	3+	3+	3+
	Penicillium puberulum	—	—	—	—	—	3+	3+	3+	3+	3+	3+	3+	3+	3+
	Chaetomium globosum	—	—	—	—	—	—	+	+	+	+	2+	3+	3+	3+
	Mucor racemosus	—	—	—	—	3+	3+	3+	3+	3+	3+	3+	3+	3+	3+
Sodium 2, 4, 5 trichlorophenate (Dowicide B)	*Aspergillus niger*	—	—	—	—	—	—	—	—	—	—	—	—	—	3+
	Penicillium puberulum	—	—	—	—	—	—	—	—	—	—	—	—	3+	3+
	Chaetomium globosum	—	—	—	—	—	—	—	—	—	—	—	—	—	3+
	Mucor racemosus	—	—	—	—	—	—	—	—	—	—	3+	3+	3+	3+
Sodium 2 chloroorthophenylphenate (Dowicide C)	*Aspergillus niger*	—	—	—	—	—	—	—	—	?	3+	3+	3+	3+	3+
	Penicillium puberulum	—	—	—	—	—	—	—	—	—	3+	3+	3+	3+	3+
	Chaetomium globosum	—	—	—	—	—	—	—	—	—	+	2+	2+	3+	3+
	Mucor racemosus	—	—	—	—	3+	3+	3+	3+	3+	3+	3+	3+	3+	3+
Sodium 2, 4, 5, 6 tetrachlorophenate (Dowicide F)	*Aspergillus niger*	—	—	—	—	—	—	—	—	—	—	—	—	3+	3+
	Penicillium puberulum	—	—	—	—	—	—	—	—	—	—	3+	3+	3+	3+
	Chaetomium globosum	—	—	—	—	—	—	—	—	3+	3+	3+	3+	3+	3+
	Mucor racemosus	—	—	—	—	—	3+	3+	3+	3+	3+	3+	3+	3+	3+
Sodium pentachlorophenate (Dowicide G)	*Aspergillus niger*	—	—	—	—	—	—	—	—	—	—	—	3+	3+	3+
	Penicillium puberulum	—	—	—	—	—	—	—	—	—	2+	3+	3+	3+	3+
	Chaetomium globosum	—	—	—	—	—	—	—	—	—	—	3+	3+	3+	3+
	Mucor racemosus	—	—	—	—	3+	3+	3+	3+	3+	3+	3+	3+	3+	3+

Fig. 6—Starch sized coating on paper.

nature of the Dowicides is appreciated. For example, casein can best be preserved by Dowicide B (Sodium Trichlorophenate). Spoilage of starch solutions resulting from activity of microorganisms is best prevented by small concentrations of Dowicide G. Casein and starch solutions may be held without decomposition for long periods of time by using Dowicide G alone or in combination with other Dowicides. The amount of preservative required will in all cases depend upon the concentration of decomposables, and the period of time over which the solution is to be preserved.

Mold Resistant Papers

Frequently paper products are used or stored under conditions favoring mold growth and it is, therefore, desirable that such materials be made mold resistant. Corrugated board, egg case fillers and flats, gummed tape, and soap wrap papers are a few materials that might be mentioned.

Corrugated and Laminated Board

It is obvious that when materials having a high moisture content are stored in paper containers, such paper will absorb the moisture from the product. If the moisture content of the container rises above that necessary to support mold growth, the paper will mold.

Complete protection can be obtained by treating the liner stock at the beater. Since it frequently happens that of a given run of paper only a relatively small amount is to be used for box board, with the remainder going to other uses not requiring mold resistance, special means are necessary to impart mold resistance to that portion used for container board only. One successful method is the treatment of the liner stock at the calender, providing a silicate bonding agent is used to paste the corrugated stock board to the outer ply. Where starch is used as the adhesive, however, another method which depends on the diffusion and vapor characteristics of the Dowicides is recommended. In this case, the addition of 2 per cent by weight of Dowicide G to the starch adhesive is recommended. This concentration allows for diffusion of the Dowicide G by means of the wetting action of the starch so that mold resistant surfaces are obtained (Figure 4). Problems of this nature should be treated individually and recommendations as to the fungicide requirements made solely on the basis of use.

Egg Case Fillers and Flats

The production of mold resistant egg case fillers and flats is one of the most interesting developments in this field. Formerly, the only method of preventing the growth of mold on eggs during cold storage was to maintain the humidity at such a point as to prevent the formation of a microscopic film of water on the eggs. While this low humidity prevented mold growth to a great degree, it caused egg shrinkage which decreased their value. From the experimental work conducted by Mallmann and Michael (Mich. State College Tech. Bull. 174, Nov., 1940) at Michigan State College it was shown that the Dowicides are excellent mycostats (Table II, Table III).

This mycostatic effect is so pronounced that not only can the egg case fillers and flats be made mold resistant, but eggs stored in such treated containers will not show mold growth

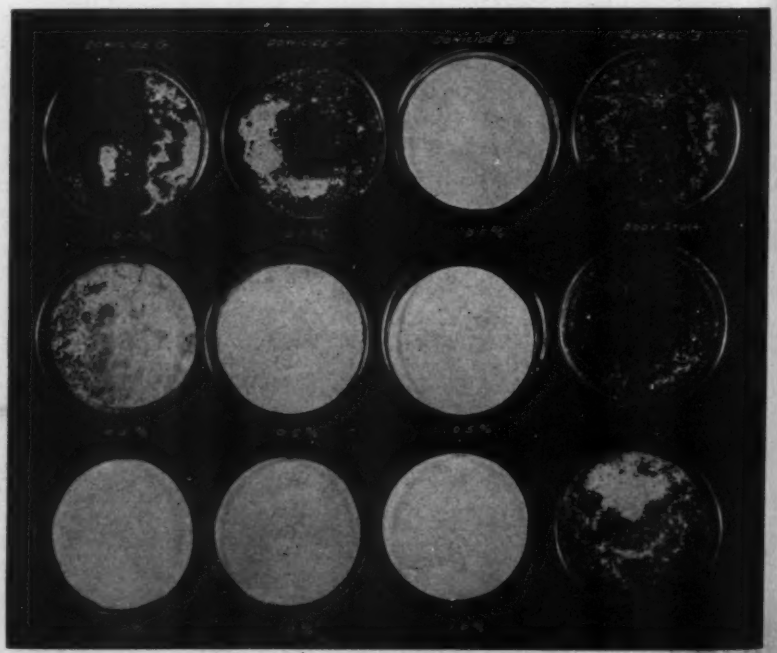


Fig. 7—Casein sized coating on paper.

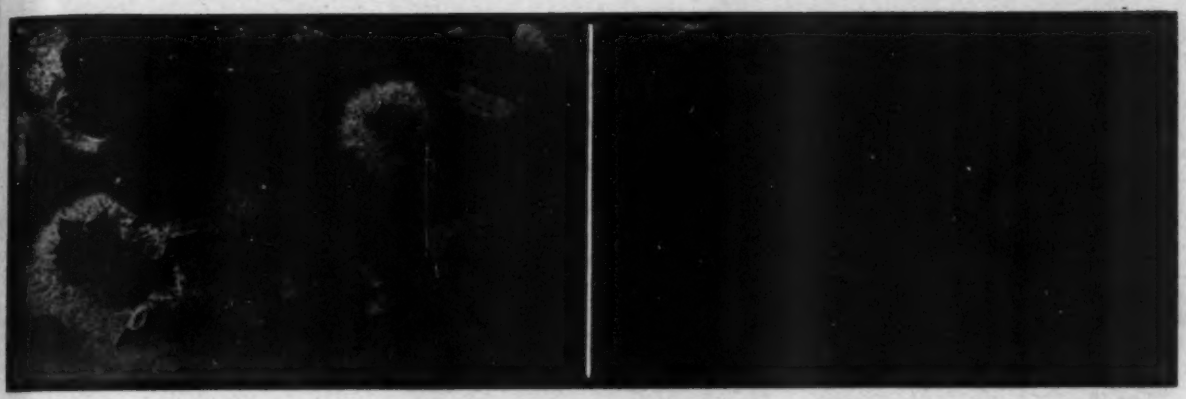


Fig. 8—Mold resistance of Dowicide treated gummed tape. (Left—Untreated. Right—Treated with Dowicide A 1%.)

even though a film of water is present on the egg surfaces. Attention should be called to the fact that although Dowicide B (Sodium Trichlorophenate) is the most effective mycostat, it is not the best fungicide to use for this application. Since fillers and flats are made up far in advance of the market, it is necessary to use a Dowicide which is more permanent, even though a higher concentration is necessary to obtain the desired mycostatic effect. Dowicide G is now being used commercially for this reason (Figure 5).

Soap Wrappers

Another paper product requiring mold resistance as one specification is the soap wrapper. The inner wrap and the coated or waxed outer wrap are now being treated to prevent the mold growth that occurs when soap, which generally has a high moisture content, is held in storage, Calender ing with a fungicidal solution of Dowicide A or G is a very satisfactory means of making inner wraps mold resistant. For the waxed outer wraps the oil soluble Dowicide 1 (Orthophenylphenol) is dissolved in the wax and by its fungicidal and fungistatic action inhibits mold growth on paper beneath the wax film.

Coated Paper

Coated paper presents a more complex problem of preservation. The type of coating determines the fungicide that may best be used, since starch, alpha protein, and casein all differ in their compatibility with the various fungicides. In the case of coatings on both sides of the base stock, the coating material itself may be treated and thus produce mold resistance throughout the coated sheet. With single surface coatings the degree of mold resistance obtained from the coating may not be sufficient to impart resistance to the uncoated side of the stock. In this case, the base stock should be treated either by adding the Dowicide at the beater or at the calender previous to coating.

The degree of mold resistance to be obtained with starch and casein coatings is shown in Figures 6 and 7.

Gummed Tape

Figure 8 illustrates the mold resistance that may be obtained by treating the glue with Dowicide A. To secure complete mold resistance it is also necessary to treat the paper backing with Dowicide.

Prevention of Decay and Termite Attack

The use of paper products in the building industry has created the problem of making such materials immune to the ravages of insects and decay. Treatment of insulation board and building papers with Dowicide G will provide the termite and rot resistance required. The reason for the selection of Dowicide G is apparent since it is the most permanent of all products of this type. Dowicide G may be applied at the beater or to the board after it is

TABLE III—Mycostatic action of Dowicides A, C, F, and G treated fillers, flats, and cases on eggs stored for 84 days at 34 deg. Fahr. in saturated atmosphere contaminated with mold spore mixture.

Treatment	Per cent concentration*	Presence of molds			
		Fillers	Flats	Cases	Eggs
None		4+	4+	4+	4+
Sodium orthophenylphenate (Dowicide A)	0.05	±	±	—	—
	0.07	±	±	—	—
	0.09	—	—	—	—
	0.1	—	—	—	—
	0.2	—	—	—	—
	0.3	—	—	—	—
Sodium 2 chloroorthophenylphenate (Dowicide C)	0.05	±	±	±	—
	0.07	±	±	—	—
	0.09	—	—	—	—
	0.1	+	+	—	—
	0.2	—	—	—	—
	0.3	∓	∓	—	—
	0.4	∓	∓	—	—
	0.6	—	—	—	—
	0.8	—	—	—	—
Sodium 2, 4, 5, 6 tetrachlorophenate (Dowicide F)	0.05	—	—	—	—
	0.07	—	—	—	—
	0.09	—	—	—	—
	0.1	—	—	—	—
	0.2	—	—	—	—
	0.3	—	—	—	—
	0.4	—	—	—	—
	0.6	—	—	—	—
	0.8	—	—	—	—
Sodium pentachlorophenate (Dowicide G)	0.5	±	±	—	±
	0.07	±	±	—	±
	0.09	±	±	—	±
	0.1	±	±	+	±
	0.2	+	±	—	—
	0.3	—	—	—	—
	0.6	—	—	—	—
	0.7	—	—	—	—
	0.8	—	—	—	—

*Fillers, flats, and cases soaked in concentrations indicated.

formed on the machine. A concentration of 0.6 per cent to 0.75 per cent on the dry weight of the board should be retained. In this application, as in lap stock preservation, conditions should be such that the phenol form or an insoluble salt of the pentachlorophenol is precipitated. If the *p*H is not sufficiently low to cause the precipitation as the phenol, acid reacting materials should be added. Tests in field plots in Louisiana and Florida show a remarkable degree of decay and termite resistance (Figure 9).

There are, of course, many other uses for this group of industrial germicides and fungicides in the paper and pulp industry. While it may be said that the mere presence of bacteria or fungi does not necessarily constitute a problem, it follows that the absence of such organisms is good insurance against the costly deterioration which occurs in this industry.

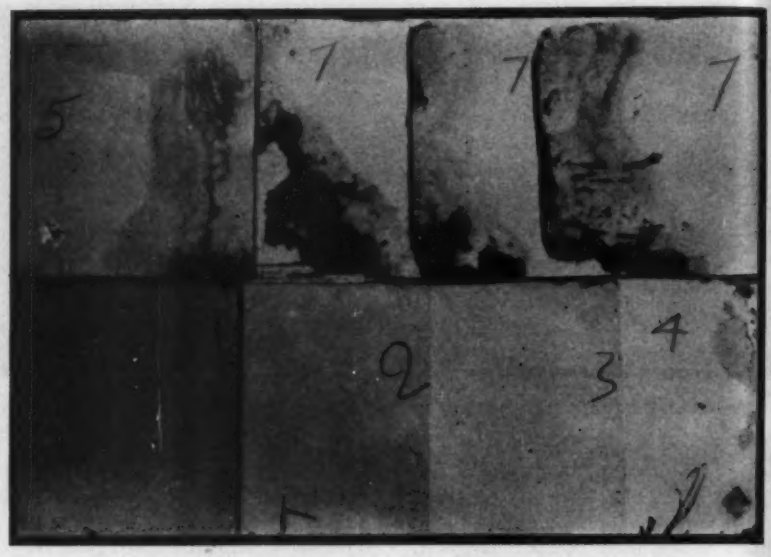


Fig. 9—Rot and termite resistance of wallboard. Undamaged specimens are Dowicide treated.

Prolong Instrument Life*

▶▶▶ CONTINUED ENJOYMENT OF BENEFITS provided by industrial instruments is dependent, to a large degree, upon the care given them. The high priorities required for new instruments, and the inconvenience resulting from instrument failure before replacement can be made, makes it imperative that every possible step be taken to prolong the life of instruments now installed.

This summary of steps that can be taken to prolong instrument life can be used as a convenient guide on instrument care in your plant, regardless of the make of instruments used.

Centralize Responsibility. All instruments in a plant should be the responsibility of one man, or a group of men, depending upon the number of instruments used. Responsibility for instrument care and maintenance should not be left to the men operating the equipment on which they are installed, as this practice will result in complete lack of maintenance until instrument breakdown, or in unnecessary or harmful tampering by individuals unfamiliar with instrument operation.

Locate Properly. Improper location and improper installation of industrial instruments probably cause more trouble and inaccuracy than fault or failure in the instruments themselves. It is as important that instruments be installed where they can be properly serviced and protected, as it is to install them where the bulb, thermocouple, photo-electric cell, radiation head or other "sensing" unit can reach the temperature, pressure vacuum, or other condition the instrument is to measure.

Eliminate Vibration. Prolonged vibration, or shock resulting from careless handling, are chief causes of instrument failure. Installing instruments on vibration mounts will minimize the effects of vibration. A better method is to mount instruments in locations where vibration is not present. Instruments should not be mounted upon moving equipment. If instrument panels also carry contactors, these contactors should be removed so that the shock to the instruments resulting from contactor operation is avoided.

Protect From Dirt. Next to excessive vibration, infiltration of dirt probably causes most industrial instrument trouble. Where instrument movements are particularly sensitive to foreign material that might affect their operation, they usually are provided with dust-proof cases. Such instruments should be opened as infrequently as possible, and then preferably in the instrument shop or in a room where provision can be made to keep parts clean.

Avoid Excessive Temperatures. For best results, excessive temperatures, both high and low, must be avoided at the point where the instrument is installed. An instrument is built to give best operation at room temperature, approximately 70 degrees F., and prolonged use at extreme temperatures will affect the instrument's accuracy.

Corrosion Hazards. Any instrument, regardless of its function, will be impaired if placed in a corrosive atmosphere. Corrosive fumes attack instrument finish, moving parts, measuring systems, and may directly result in measuring error and impaired or erratic performance. Special corrosion-proof cases are available for most instruments, but even they do not give absolute protection when the necessity of opening case doors for chart changes on recording instruments, and adjustments to other instruments, is considered.

Avoid Excessive Moisture. Excessive moisture will often harm industrial instruments. For installations where moisture cannot be avoided, a protecting case is recommended.

Do not expose instruments to strong magnetic fields.

When installing or relocating instruments, make sure all connections have been made exactly as specified in the instructions. All connections must be tight and free from dirt and moisture. Clean the contacts and terminals often.

Charts for recording instruments should be stored in a cool, dry place. Keep charts flat, preferably in their original package, until used. When recording instruments are out of service for any length of time, shut off power to the instrument and remove ink from the pens.

(*) From Wheelco Comments, published by Wheelco Instruments Company.

TALL OIL RECOVERY

▶▶▶ HOW MANY SOAP MANUFACTURERS produce from 5 to 25 tons of soap in 24 hours? Southern kraft mills do, and most of it is burned as waste.

Why is such waste tolerated? It is because the making of kraft constitutes a relatively new industry. In 1920, kraft production amounted to only 188,700 tons. In 1940, the production of kraft totaled 4,394,338 tons. Naturally, tall oil was of little concern to the industry in its early days. Then, it was kraft and more kraft for bags, wrapping and cartons.

Some mills, however, soon realized the possibilities of tall oil and pioneered in its recovery. Recovery consisted simply of skimming off the soap that collected in black liquor storage where, if not removed, it was a continual nuisance.

Fair amounts of soap still are being recovered in this manner—possibly a quarter to a third of the soap in any given volume of liquor. The soap yield may be increased by acidifying the black liquor and by using a high boiling solvent, such as kerosene, to assist flotation. Such procedures, however, do not reduce corrosion difficulties, especially should operations get out of control.

Another forward step in the recovery of soap utilizes the increased salting out effect of the black liquor at higher densities in the evaporator room. Here by-pass and flotation tanks are employed to permit time for separation. No figures have been published on such procedure but tests indicate that another quarter to a third of the soap might be collected this way. In such event, from 50 to 66 per cent of the total soap in the weak and evaporated liquors could be collected.

Soaps collected in this manner often are pumped into large tanks where some liquor drainage is permitted before acidifying. The mass also is heated by injecting steam into it until the emulsion is broken and the oil comes to the surface, thus permitting decantation.

In other few cases, the black soaps

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are washed in two or more stages with strong salt cake solution or with white or green caustic liquors. The black liquor removed by such washing reduces the acid consumption and particularly eases subsequent manipulation. Losses also are reduced because the oil cannot be freed entirely from the lignin sludge masses.

These several methods, so briefly outlined, are covered by patents.

It is obvious that each mill recovering tall oil would produce its particular grade of crude, depending upon the method of recovery employed. Samples of crude tall oil from various sources do not bear any particular similarity as to appearance, odor, color, and viscosity. Some samples are completely solid or grained due to crystallization of the resinous constituents. All of them have a sulphide odor.

Where the oil has been flashed to remove the kerosene solvent used in the recovery, it has a decidedly burnt odor. In such a case, the moisture content has been reduced to a trace.

It has been found that the moisture content of the oil is a factor as its condition of fluidity. A higher moisture content of 3 to 5 per cent under certain conditions inhibits crystallization. Crude oils processed in this manner have shown no tendency to crystallize even after standing for several years. An oil that does not crystallize can be depended upon to flow readily from a drum or tank car whereas an oil that crystallizes can not. Likewise, crystallization alters the chemical analysis of an oil.

The odor of the crude oil has been a disadvantage but not so much as has crystallization. To overcome these disadvantages, the oil usually has been refined by distillation and by centrifuging—distillation taking off the first fraction low in resin content; centrifuging removing the crystalline resins of the later fractions.

Industrial acceptance of tall oil has been impeded by its nonuniformity in both chemical analysis and physical condition. The super-fatted nature of tall oil, for example, is preferred in soap manufacturing but its scarcity and non-dependability does not warrant a change in soap formulas. Likewise, tall oil gives greater stability to grease both as to use and as to shelf life in cans. Usually, for such a purpose, oil in the crude form would be preferred because of the fatty alcohol sterols it contains. Refined tall oil, however, would be required for high grade grease.

The possibilities of tall oil in producing paint and drying oils have long been recognized by paint manufacturers. Here again, the question of volume has been the deciding factor as to its use.

Processes have been developed recently which definitely increase the drying properties of oils by increasing the unsaturated double bond carbon linkages in the oil structure.

Within recent years, the concept of oil has changed from oil as a final product to oil as a raw material from which to produce other valuable chemicals. The host of wetting agents, detergents, emulsifiers, penetrants, defoamers, levellers, etc., now on the market is proof of what has been done in this direction.

Kraft mills having recoverable tall

oil are not so much concerned at present with tall oil specialties as with reclaiming of the crude. Some mills, as previously indicated, are using the batch and stage method with fair success. Other mills have taken the wait and see attitude, hoping for more information on the subject. Now tall oil producers are clamoring for black liquor soaps from the mills to fill oil demands; and in some instances, where the haul is short, mills are making such shipments.

When all factors of soap collection and shipment, however, are scrutinized, the practice does not appear to be very satisfactory. A mass of black liquor soap collected from storage consists of about an equal volume of air, water and oil. By weight, the soap consists of about equal parts of water and oil (not allowing for 10 to 20 per cent of black liquor contamination and entrainment).

A 200-ton kraft mill in the South yielding about 10 tons of crude tall oil by the Cirves continuous process of extraction would supply 20 tons of soap daily. On a volume basis, the soap would occupy space equivalent to 30 tons, or about 4 tank cars—not a very promising procedure in view of the present tank car shortage.

Where mills could have access to an efficient method of soap recovery and could extract the crude oil continuously, the need for large tank storage, treating tanks and buildings would be minimized. Almost from the beginning of tall oil recovery, development work has been done to this end.

The use of air to assist in the flotation of soap from the liquor and to increase the soap yield probably has been tried by all investigators. Results of such effort have been negative for three reasons: (1) The coagulated soaps are blown to soap films which consist mostly of liquor; (2) the injection of air into a receptacle causes agitation of the liquor and redisperses the soap; (3) air injection into the hot liquor causes the liquor vapor and condensate to redissolve the soap.

In 1932, the author observed that aeration under certain conditions increased the yield of soap. It was noted that black liquor piped to an open liquor storage tank produced more soap when the tank was only partially filled; that liquor, falling from a pipe line and entraining air as it splashed into a tank, produced pronounced quantities of soap; and that when aeration of the liquor was prevented by immersing of the discharge pipe, no such quantities of soap were floated.

With these observations in mind, compressed air was injected into a flowing liquor line behind a mixing nozzle. When such aerated liquor was discharged into an open tank, finely divided particles of yellow soap were released and floated upon the surface of the liquor. This soap could be separated from the liquor, if the operation was performed immediately; but most of the soap on the surface of the liquor disappeared when left to stand overnight.

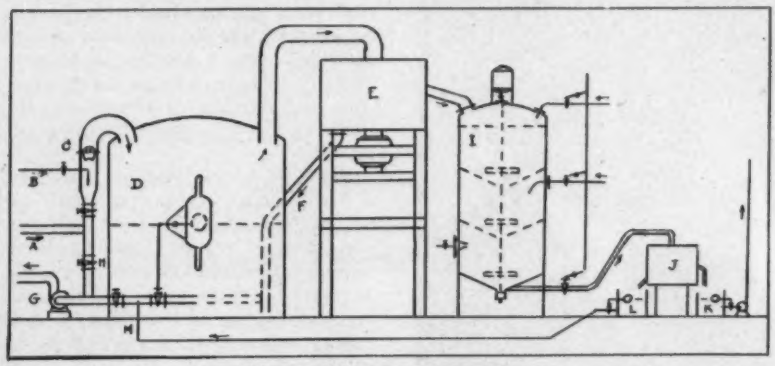

Fig. 1—Tall oil recovery process.

Continued tests, under various conditions of operation, indicated that a very small quantity of air was required and that lower liquor temperatures produced lower yields. Such yields could not be predicted upon the theory of greater salting out effect at the lower temperatures.

Air injection at higher temperature appears more efficient due to lower liquor viscosity and greater dispersibility of the air in reaching the tiny, globulated soap particles in the liquor. Viscosity, however, cannot be the single factor without temperature, because aeration works equally well with liquor of 14-26 Bé. (after all evaporator effects) and temperatures from 135 to 220 Fahr. Aeration of black liquor in storage at 7 Bé. and 180 Fahr. produced a mass of incollectable soap films and bubbles.

The optimum condition for soap extraction by aeration is at a liquor density of 1.1 and at a temperature below excess steaming (130 to 150 Fahr.). The soap extraction efficiency by aeration is in the neighborhood of 88 per cent. With the addition of about one-third of the soap, collected in storage, the total yield may approximate 92 per cent of the soap present in the liquor.

A reaeration of the liquor produces no additional quantities of soap.

A pilot operation was set up after the first effect evaporator at a liquor flow of 40 to 50 gpm. Also a very small apparatus with a half inch pipe liquor line was constructed and which discharged the extracted soap into a laboratory pulp centrifuge. By this method, the soap and tall oil yield of the liquor could be determined before as well as after extraction. This small device in reality is a soap analyzer and will determine the efficiency and extractability of tall oil from any liquor.

Details of this method for extracting tall oil, known as the Cirves process (U. S. Patent No. 2,200,468, May 14, 1940).

The black liquor is by-passed between the first and second effect evaporator units to the soap extraction plant (Fig. 1) where it enters at (A) at a pump pressure of 25 to 35 lb. Air at 50 to 100 lb. pressure is injected into the liquor line at (B) and emulsified at nozzle (C) whence it is blown into enclosed soap extraction tank (D). Thence the aerated soap is blown from the tank through a six inch pipe into a 24- or 30-in. basket centrifuge (E). Any entrained liquor is removed and dropped by means of a barometric leg (F) back into the tank. A constant liquid level regulator permits the liquor to be returned by means of the pump (G) to the next evaporator effect. Thus, normal operation of the evaporator is not disturbed at whatever capacity it may be running. In case of a desired shutdown of the soap plant, the by-pass valve (H) is opened and the rest of the system closed without disturbing the evaporator.

The soap from the centrifuge is of the consistency of floated soap but of a light yellow color. It passes into agitating tank (I) which has three separate mixing sections. Hot water is added to the upper section; sulphuric acid, to the middle section; and steam is injected into the lower section. The spent acid and oil pass out of the tank by gravity flow to the oil centrifuge (J). Here the crude oil is separated continuously into the discharge receptacle (K) and from which it is pumped intermittently to crude oil storage by means of a liquid level control. The spent acid solution (1 per cent acidity) is discharged similarly

into receptacle (L) whence it is drawn into the black liquor pump section (M). Here it is mixed and neutralized immediately with the strongly alkaline black liquor. Thus, the sulphuric acid employed in the soap plant becomes a salt cake by-product solution for mill recovery. The amount of sulphuric acid consumed is about one gallon to six gallons of tall oil produced.

The soap extractor tank is about five feet in diameter.

The soap agitating tank and reactance tank (I) is 30 in. in diameter and nine ft. high; and is lined with an acid resistant coating. In place of the agitating tank, a system of two large tanks may be employed, but such tanks would be more expensive and cumbersome.

The soap centrifuge serves to remove excess air and entrained liquor. It dispenses with multiple stage soap washing equipment and accessories.

The oil centrifuge may be of a standard type or an 18 in. bowl of special design. If necessary, the oil and spent acid can be separated continuously through the use of a tank and liquid level pump controls.

A 200 ton kraft mill using all southern pine would yield about 1-2/3 gallons of tall oil per minute or ten tons of highest grade crude oil per 24 hour day. Since the oil is separated while hot, it contains the maximum of sterols. Upon cooling, some of the sterols will settle out.

TABLE I—Factory consumption of vegetable fats and oils* (Tons in 1940)

Item	Tons	Per cent
Total	2,368,929	.....
Cottonseed Oil	639,980	27.0
Tallow, Inedible	442,342	18.7
Coconut Oil	264,101	11.2
Soybean Oil	215,820	9.1
Linseed Oil	193,112	8.2
Grease	178,256	7.5
Fish & Marine Oils	103,200	4.4
All Other Oils	877,660	13.9

*Condensed from table in Report of U. S. Department of Commerce on Animal and Vegetable Fats and Oils, D. L. Floyd, Chief Statistician, U. S. Government Printing Office, 1941.

Users of the crude prefer it to the clarified because of its highly valued sterol properties. The moisture content of the crude is about 3.5 per cent which entirely inhibits sedimentation of resinous crystallization.

The advantages of the process are as follows: (1) Minimum cost of investment; (2) low cost of operation; (3) continuous operation and small equipment space; (4) uniformity of product; (5) a noncrystallizable tall oil; (6) high sterol content oil; (7) instantaneous extraction of oil; (8) no contamination of the black liquor; (9) no interference with evaporator; (10) convenient for either small or large capacity operation.

Mills contemplating the installation of a crude oil extraction plant should give some thought to the possibility of refining. Some mills are refining already; other mills, of large capacity, will go into it. Still other mills will be content to produce high grade crude oil.

The refining of tall oil presents many interesting problems. Refining by high vacuum and steam distillation is an old stand-by method for oils. The distillation of the oil may complete the refining process; or the oil may be fractionated into oils with lower and higher resin contents. Where crystallization of the refined oil is undesirable, the resins may be removed by filtration or by centrifugal action.

Because of the heterogeneous nature of tall oil, some commercial oil refiners have discontinued the practice of refining the oil by separating the fatty oils from the resinous constituents. Other refiners are carrying out research on various phases of the subject, and advancements are being made.

The refining losses by direct distillation are high. Made up of pitch, volatiles, and light oil fractions, they amount to about 30 per cent. A greater part of the loss in the form of residual pitch can be eliminated by previous removal of the sterol content. At the high temperatures of distillation and because of the catalytic action of the metals of the still, the fatty alcohol sterols combine to form esters with the acid oils and resins. With a sterol content of 6 per cent, there will be a loss of 4 per cent of the acid oil with a total of 10 per cent accounted for. The pitch will hold by entrainment enough of the resins to raise the accountable pitch losses to 15 per cent.

Commercially distilled samples of tall oil have been known to revert to the original red color of the crude upon standing for a few months. This reversion of color indicates that distillation does not remove the color bodies in the oil but simply deoxidizes them —only to re-oxidize again when exposed to light and air. By the removal of the sterols, better yields are obtained; and by the use of catalytic inhibitors, very high permanent color of first as well as end fractions may be obtained at a high yield of 95 per cent.

Refined tall oil of high quality has been produced at lower cost by methods other than high temperature distillation. These methods involve the use of solvents and diluents, chemical treatment, and solvent removal or evaporation. A low cost refined tall oil of the highest quality has been produced by a 3 to 1 dilution of the oil with Skellysolve. A subsequent treatment with concentrated sulphuric acid settles the pitch with color bodies. After the decanted solution is washed and neutralized with water, the Skellysolve is distilled off. Then, filtration of the residue with a little activated earth produces a bright faintly yellow oil which has no tendency to crystallize.

TABLE II—Factory consumption by classes of product* (Tons in 1940)

Item	Tons	Per cent
Total	2,368,929	.....
Soap	861,317	36.4
Shortening	598,212	25.2
Other edibles	240,189	10.1
Paint & varnish	217,368	9.2
Oleomargarine	127,976	5.4
Linoleum & oil cloth	55,906	2.4
Other products	325,867	11.3

*From Report of U. S. Department of Commerce on Vegetable Fats and Oils, D. L. Floyd, Chief Statistician, U. S. Government Printing Office, 1941.

Crystallization can be brought about and removed by centrifugal action whereupon a high quality oil of low resin content is obtained.

A similar treatment with sulphuric acid was the subject matter of a foreign patent which has expired. The method, therefore, is open for general use and for such improvement as can be incorporated with it.

An investigation of the patent literature reveals other unusual methods of refining tall oil. The main theme of these patents is to separate the constituents in their purest forms. To what extent such separations are necessary remains to be seen.

The factory consumption of oils and fats in the United States for 1940 is shown in Table I; while Table II shows the consumption by kinds of products.

The estimated tall oil available from all mills in the United States has been placed at an annual production of about 100,000 tons. Compared to the data given in Table 1, the potential tall oil available would approximate the fish and marine oil consumption, or less than 5 per cent of the total oils and fats consumed—not much of a factor in the total market, yet buyers continually are searching for quantities of it which might be available. The question "Shall tall oil be produced?" is giving way to the question "What is the practical and efficient way of producing it?"

The Technically Trained Man and His Writing

CHARLES E. ROGERS

▶▶▶ ONE OF BENJAMIN FRANKLIN'S success maxims which has jingled down through the years fits modern life better in its parody form than the original. The parody runs:

Early to bed, early to rise,
Work like hell, and advertise.

Franklin, the most articulate business man of his era, owed his success in large part to the fact that he actually *did* practice what this modern parody of Poor Richard preaches.

Probably Poor Richard would have hesitated to put it so bluntly. Franklin would probably have endowed the thought with divine sanction, as he did when he had Poor Richard say, "God helps them that help themselves."

A perfect text from the scriptures would be, "Let your light so shine before men that they may see your good works. . . ."

Poor Richard, if he didn't express the idea, often must have thought how pertinently the passage applied to the age of technology which, even in the days of the almanac, was already finding the form of a new civilization, forged out of the strong forces of trade, transportation and communication.

A thousand times more should the technically trained man of today perceive the necessity of expressing himself intelligently through the written word. To pursue this theme, along with suggestions as to what procedure to follow in developing proficiency in self-expression, ought to be little short of absurd when addressing paper makers—they who produce the basic medium of written communication.

EDITOR'S NOTE: This article is an informal personal message to the technical men of the industry from Professor Rogers who is head of the Department of Technical Journalism at Iowa State College, Ames, Iowa.

But I am convinced that the technically trained man too often *does* keep his light under a bushel; hence my brashness in addressing him on the disadvantages of his modesty. I am sure that the bane of the technical man's existence is the necessity of writing of all kinds—reports, articles, even letters and memos. There are too few Benjamin Franklins among technically trained men.

Still writing in his eightieth year during the month of his last sea voyage, Franklin wrote more on scientific matters than in any month of his life (*1*). He said that the garrulity of an old man had got hold of him, and he turned out a long letter to a friend which has come to be known as his "Maritime Observations," containing observations on the rigging of a ship; a device to keep hawsers from breaking at the sudden swell of a wave; the use of water-tight compartments in a ship to prevent sinking; fire, lightning, collision with other ships or icebergs, and half a dozen other related topics. "As I may never have another occasion of writing on this subject, I think I may as well now, once and for all, empty my nautical budget," he concluded.

Probably a good many of Franklin's contemporaries criticized him for being too articulate; but most of these are forgotten. Perhaps they never had an idea to express; if they did, they were too timid.

These timid ones, and all like them, were scolded by another American who, like Franklin, had much to say throughout a lifetime of useful work: "We but half express ourselves, and are ashamed of that divine idea which each of us represents," wrote Ralph Waldo Emerson in his essay on Self-Reliance.

A successful engineer told me once that when he was a young man he made it a habit to read the essay on Self-Reliance every month or oftener. The recollection of this good friend's advice causes me to turn to this Emersonian tonic frequently for that fount of inspiration. Emerson wrote of man's inferiority complex, though the term had not yet been invented:

"In every work of genius we recognize our own rejected thoughts. . . .

"Man is timid and apologetic; he is no longer upright; he dares not say 'I think,' 'I am,' but quotes some saint or sage. He is ashamed before the blade of grass or the blowing rose. These roses under my window make no reference to former roses or better ones.

"Why should you keep your head over your shoulder? . . . A foolish consistency is the hobgoblin of little minds, adored by little statesmen and philosophers and divines. . . . Speak what you think now in hard words and tomorrow speak what tomorrow thinks in hard words again, though it contradict every thing you said today."

Recently my friend, the inspiring engineer who has always read Emerson, wrote a prose poem about his garden in southern California, where he has retired. He wrote the letter to his old teacher, she who taught him his letters 60-odd years ago in a southern Missouri village where she still lives. That was almost all the formal training in writing that he ever received. May I read you a paragraph of this poet-engineer's letter?

"Outside my big bay window the tall poinsettias nod gracefully in a gentle breeze. They are getting along towards the end of their career for this season. Soon they will be cut back to the ground and by next December they will again be eight and ten feet tall bearing their giant flaming flowers. We have many kinds of flowers. Just now the garage roof is covered with

roses, and most any time there are quite a number of rose trees. There are palms of two varieties—graceful things—and many fruit trees. Three bearing lemon trees are doing nobly to bring down that kind of fruit. It makes one think of tall cool glasses of lemonade—or lemon sours, depending on who does the thinking."

I do not know how this engineer learned to write such charming prose—by reading no doubt; and by writing. Nobody learns to write any other way except by reading and writing. For teachers only exhort, criticize, guide, and sometimes stimulate. Teachers after all, as my old friend the writing engineer who has a rose garden in California so well demonstrates with his charming letters, teachers do not necessarily count for much, not if one has self-reliance enough to believe he can do it, and wants to enough to try.

Ben Franklin, Ralph Waldo Emerson, my friend, the engineer, and a million others have become writers because they had the urge for self expression and the art to make that expression effective, persuasive, interesting—in short, to do what any writer sets out to do. I have not seen my friend's, the engineer's, professional papers or his reports or business letters, but I will wager they are clear, concise, original and interesting. I have heard him speak; I have seen his letter from California; and I know he made such a contribution to society that society permitted him to retire in well earned security. He didn't make his contribution out of mere luck. He made it with his head, with ideas which he was willing to express, ideas which were made to do his bidding because he expressed them with meaning and advantage.

Every teacher of writing has his collection of grateful little testimonials from former students who tell how writing skills have given them advantage and promotion over others no less talented, except in the will and the skill to write. A young officer in the Army writes his English teacher gratefully: "My first job was to write a series of four reports for my colonel who allowed me four days to find the material and prepare the report. My training in writing came in handy on that job." Another tells of promotion which resulted directly from two reports in connection with plant production. Others in the plant, he said, were college graduates, but he forged ahead of them because he had what they lacked, knowledge concerning report writing. Often men must write reports on particular jobs to be used as procedures in training and to do the operations of the job—and their knowledge of the writing craft helps. Yes, they must be accurate, terse, clear. They may as well be interesting, too, because the people who are expected to read them are human beings who won't read them unless they have to, unless they are interesting.

Most of the young fellows in college who devoted their attention wholly to so-called practical things would be earning a thousand dollars a year more today if they hadn't turned up their noses at courses on how to write (*2*). They would have been spotted for more rapid promotion because of the lucidity of their letters, memoranda, office reports, reports of surveys, and articles written for business papers. These writings would have kept their authors in active circulation. People would know they had ideas and personality and ability, because these would have been communicated.

People might have said of one of these young men on the make, "Oh, yes; he's his own best press agent." That's true! Every man, if he only will, can be his own best press agent. Nobody can hire a stenographer or a ghost writer or a director of public relations who can express his employer's ideas and personality as well as he can himself.

▶▶▶ Up to this point I have tried to answer the question, Why should a technically trained man be able to express himself through the written word?

Now I shall try to answer a harder question: What procedure should he take to develop proficiency in self-expression?

The most important step in the procedure is to get at it. Nobody ever learned to write except by writing. Those who wait for inspiration end up with nothing but alibis. What shall one write? Write about your work. Write letters to friends. Write memoranda to your associates, or your boss. Write reports to members of your board of directors. Write for your trade paper. Excuses for writing could be multiplied.

All effective writing has two characteristics in common with a well-written letter; it is written for a definite audience and it is unaffected.

Writing that is for a definite audience is motivated by a desire to tell what the audience wants to know, in language that is familiar to that audience. A papermaker, writing for other papermakers, would enrich his writing with the idiom of the industry. He would introduce familiar illustrations to carry home his message. He would have visited many of his readers in their offices and plants, talked to them, learned the way they talk and think, picked up the language of the trade. If he did this, his writing would bear the ring of sincerity and carry conviction.

If I gain your sympathy—since I am not myself a papermaker—it is because you accept what I have to say as applying to all technical men. I am a professor of *technical* journalism. My students are technically trained men who study journalism for the purpose of applying it to one of the great industries. In this we have a common bond. I hope this article reads like a personal letter to each of you, my papermaker readers.

One of the greatest bars to convincing and compelling communication is self-consciousness. Much of this is due to inexperience. One who seldom writes gets stage fright when he takes pen in hand. An editor of a technical magazine once suggested that stiff-necked writing might be corrected if the professors encouraged sloppy writing. Well, not really sloppy of course, but deliberately careless, skillfully careless, to get engineers to loosen up, shake their legs, wiggle their ankles a little when they write. He said the writing of engineers is a withered leaf carefully dried and prepared between the pages of a book. What it needs, above everything else, he concluded, is sap (*3*).

Professors of writing and editors of all kinds of papers encourage this stuffy manner with their emphasis on what they call style. It would be a good thing if all of them were required to visit the Will Rogers memorial at Claremore, Oklahoma, where some of Will's original copy is on display. Will didn't follow rules of grammar or anybody's principles of style. (There are as many sets of style rules as there are professors and editors.) Will was content to write the symbols which expressed his ideas. He left it to the editors to put in the capital letters and commas, correct the spelling, and sometimes make verbs agree with their subjects.

Yes, of course, Will carried the thing too far for technical writing, yet one could wish that more technical writers enjoyed Will's lack of inhibitions when they touched pen to paper.

▶▶▶ We have taken three steps in developing proficiency in self expression. First, we have made the necessary beginning, for without practice we shall never develop proficiency. Then we have resolved to write for a

definite audience, for to convey ideas there must be somebody to receive as well as to send them. Thirdly, we are determined to act naturally, because people who are technically trained are also human.

Now we shall have to pay some attention to order, for disorder is a symptom of a befuddled brain. Technical writing has as its primary purpose the communication of ideas. Writing may be human and interesting, convincing and inspiring, but it must be informative. Technical writing is not for entertainment, as is much journalistic writing, intended for the general reading public. Nor is technical writing for the expression of eternal truths, as is literature. Technical writing is exposition. Its purpose is to inform.

All right, you have an idea which you wish to communicate to another.

Words begin to pile up in your mind. What to do with them?

For clarity of exposition, use words that are common in every-day speech. If you talk with a fellow technician you naturally use technical words. Similarly, when you write for him, don't hesitate to use the same kind of words. But here is a word of caution: don't go to the book for new ones, that is, words that are not in your active vocabulary. This is a fault with technical writers—they have a tendency to become bookish when they write.

Some of the worst writers are authors of text books. Abhor them as models. A well meaning friend once said to me, shortly after I became an author, "Any damn fool can write a text book." It's true—writing a text book requires little knowledge of the craft of writing. And it's a pity the bad writing in them is imitated.

The words we use in every-day speech for the most part are of Anglo-Saxon origin. Usually they are short words. Furthermore, they have been in the language a long time, so they are familiar to everybody. Edwin Slosson, the founder of Science Service, had a lot of trouble with scientists who defined a hard word with a harder one. He said, "If you think you must define the calorie, say casually something like this, that 100 calories of energy can be derived from three cubes of sugar or from a small pat of butter, or explain that a man needs to expend 100 calories an hour to keep his body running, and 160 calories if he is working hard." The book definition that Slosson cited in contrast stated that a calorie was "the quantity of heat necessary to effect a rise in temperature of one degree centigrade of a cube of water each dimension of which is one-tenth part of the length of a bar of platinum and iridium alloy lying in the observatory of St. Cloud."

In scientific writing of course formal definitions are unavoidable, but even so they can be cast in the language which the scientist normally speaks, the assumption being that he speaks English and not jargon.

An excellent thing for scientists to read is the essay on jargon in the little book entitled *On the Art of Writing* by Sir Arthur Quiller-Couch. It is a collection of lectures Sir Arthur gave to Cambridge students. Sir Arthur does not make the mistake of defining jargon. He tells what it does and what it fails to do. This is jargon's method: "to walk circumspectly around its target; and its faith, that having done so it has either hit the bull's-eye or at least achieved something equivalent, and safer." For example—one of many—he quotes from the sedate London Times:

"One of the most important reforms mentioned in the rescript is the unification of the organization of judicial institutions and the guarantee for all the tribunals of the independence necessary for securing to all classes of the community equality before the law."

Aside from its difficult diction, the passage suffers from an ailment in sentence structure. For rapid reading, the grammatical structure of a sentence should be evident. This goes beyond the requirement that a sentence shall be grammatically correct. It may be correct and still be difficult to read. The safest rule is to cast sentences short, though for the sake of variety all sentences may not be short. The longer sentence is properly employed for the purpose of summarizing a number of points. But no sentence should contain irrelevancies. I recently heard of a professor who, so one of his students declared, lectured almost entirely in parenthetical remarks. He was forever climbing out on limbs, and from limbs onto branches. His lectures always ended before he reached the end of a single sentence.

One last word is a rule of thumb which I have found helps technical and scientific writers to avoid roundabout language. This is the admonition to prefer active to passive verbs.

A verb, properly speaking, is a word that asserts or declares. Predication—proclaiming or affirming one thing or another—is the essential function of a verb, and this function is all that makes a verb. It expresses vigor and masculinity and movement.

But an unwritten law of science and technology commands us to speak and write with detachment. We must never proclaim that we *did* a thing. We must detach ourselves. Thus we rob our actions of their strength with verbs in the quasi-verbal passive voice. We may only admit that the thing *was done*. A millwright does not *build* a factory; a factory *is built*. WPB doesn't *issue* orders; orders *are issued*. Engineers *are credited with;* a machine *is invented;* the inventor's name *is withheld;* cable conveyors *are used;* a great deal of water *is passed* over a dam.

I have written much more than I intended when I began. I shall end, I hope, before I violate another of Edwin Slosson's "Don'ts": "Don't imagine that you must add a pretty but superfluous paragraph at the end, like the coda of a sonata. The most effective close is to quit when you get through."

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1) Van Doren, Carl, *Benjamin Franklin.* The Viking Press, New York. 1938. P. 727. Biographers have referred to Franklin as "the first civilized American," "the apostle of modern times," "father of American democracy." As no other figure of colonial days, Franklin seems to live today.

2) This is a paraphrase of a remark made by Philip W. Swain, editor of *Power,* in an electrically recorded conversation which he and two of his colleagues conducted on the subject, "Limitations of Engineers in Technical Writing for Publication." The occasion was a meeting of the Kansas-Nebraska section of the Society for the Promotion of Engineering Education, in 1933.

3) This came out of the conversation cited in the preceding note.

Author's Note: An excellent book for handy reference is Louis Hutchinson's *Standard Handbook for Secretaries.* (Whittlesey House, 1941.) It contains much that you have learned before, but forgotten, as well as up-to-date information such as accepted usages which your dictionary may condemn. By all means keep a recent edition of an unabridged dictionary nearby for constant reference. I have four dictionaries in my study. My favorite is an old 7-volume Century, but it's a luxury and part of my devotion to it comes from sentiment. A readable and reliable text book for writers who are seriously interested in article writing is *Technical Journalism* by F. W. Beckman, Harry R. O'Brien, and Blair Converse. Iowa State College Press, Ames, Iowa. 1943.

A WORKABLE SAFETY PROGRAM

B. H. METTERNICH, Manager
Marathon Paper Mills Co. (Ashland Div.)

▸▸▸ IF EVERY PAPER MILL should adopt some slogan which would impress upon each employee that it is his duty to protect himself and his associates from accidents, and if that duty was practiced as a part of his daily routine, accidents would be reduced to the absolute minimum.

Management must take the lead in promoting safety. When the men in the plant know and feel that their manager, department heads, safety committee, and industrial nurse are setting an example, they, too, put all their individual effort into the elimination of accidents and the building up of a safety record. One of the most important contributions to this end is the handling of an employee who has been injured. The cause of safety must be sold to this employee, and when this has been accomplished, the safety movement has won an ever-vigilant ally.

Whenever Marathon's Ashland Division has a lost-time accident or a near lost-time accident, nothing is said to the employee until he returns to work, or until he is back to normal. He is then invited to the manager's office for a friendly talk. The conversation follows any subject *but* safety, however, the question as to how the accident occurred eventually is brought up. It is an interesting fact that the employee who has been injured rarely fails to admit, quite frankly, that the injury was due to carelessness on his part. The man is then instructed to go back and explain his accident to the men working on the same job, tell them just how it occurred, and how he believes it could have been prevented. This procedure brings very good results, which is proved by the company's record of 29 months without a lost-time accident.

In 1935, the Ashland Division had a total of 18 lost-time accidents. By 1940, the total was reduced to one, and in 1941, the goal for which the management had been striving was attained. After the goal was reached, there was no let down and the mill record as of March 5, 1943, was 876 days without a lost-time accident. Several departmental records are outstanding: Shipping and steam with 16 employees, 1,387 days; maintenance with 18 employees, 1,266 days; finishing with 50 employees, 1,137 days; and paper mill with 48 employees, 876 days.

Before permitting new employees to start on the job, they are told what their fellow employees have accomplished in safety work. They are told to report all injuries (no matter how trivial) to the industrial nurse, and, most important of all, the hazards of their work are pointed out. At this plant, the older employees give valuable aid in passing on these instructions with the best of results. To illustrate this point, during the past several months a large number of new men have been employed due to selective service. Some of these men have been advanced to machine operators within several weeks, whereas previously it took several months to break in a man on these jobs. Not one of these men has been even slightly injured and much of the credit can be given the experienced men for their interest.

In addition to the work done with persons who have been injured, every instance where there has been a near injury is checked. The points involved are discussed and if guards or working conditions can be improved, action is taken at once. When this is done, the employee realizes that management is concerned for his safety, and he reacts accordingly.

As a part of the safety program, posters and movies dealing with various phases of accident prevention are used. There is also a wide-awake safety committee which plays an important part in keeping the safety movement constantly before the employees. This committee consists of three permanent members and a representative from each department. A foreman is chairman and the nurse acts as secretary. The third member of this group is an employee selected for his outstanding interest in accident prevention. This committee meets once each month and a different employee represents his department at each meeting. The foreman of each department selects the representative, exercising his judgment as to whom the experience will benefit most. Some time prior to the meeting, the permanent employee member of this committee makes an inspection of the mill and discusses at the meeting any unsafe practices or conditions that he feels should be corrected. Likewise, all other delegates bring up the problems and recommendations for their respective departments. The secretary makes a note of all recommendations which are then presented to the manager for his approval. It has been found that of several kinds of committees tried out, this type of organization has given by far the best results. In fact, in the majority of cases, unsafe practices and conditions reported were corrected immediately and discussed at the monthly meetings as a matter of record. When an employee reports unsafe conditions to his foreman, action is taken to correct same at once. This prompt action on the part of the foreman goes a long way toward encouraging the employee to report things bearing on safety that come to his attention.

In a well planned safety program, the industrial nurse is indispensable. Much of the responsibility for keeping safety foremost in the minds of the employees falls to her. She not only administers first aid, but also does many things to cut down absenteeism due to minor ailments such as colds, etc. As already stated, she acts as secretary to the safety committee. In addition to this, she has charge of the bulletin boards and posts the safety record status of each department daily. An industrial nurse must be chosen, not for her ability alone, but she must be able to make friends quickly, deal fairly with all employees, and command the respect of all.

At this plant, there are Local 157 International Brotherhood of Paper Makers and Local 251 International Brotherhood of Pulp, Sulphite and Paper Mill Workers. Too much cannot be said about their splendid cooperation toward making possible the safety records worked out at this plant. In furthering this movement, they have invited management to their meetings; they have co-operated with representatives of insurance companies in the showing of moving pictures on safety; and the discussion of safety has been given a place on the program of their regular meetings.

At Ashland there is a pulp loading operation which employs on an average of fifty men for approximately five months out of the year. Although this is a separate operation of the Marathon Paper Mills Company, it is under the same management. Its safety department is handled according to the same plan in operation at the other plant. Due to the short season, the labor turnover is considerably more than at the mill proper, however, the 1942 season was completed without an accident.

A Neutral Sizing Material for Insulating Board

L. K. ARNOLD[1] and J. B. McLEOD[2]

▶▶▶ STUDIES ON THE FIRE-PROOFING of cornstalk insulating board have proved that solutions of certain chemicals sprayed on the surface of the board markedly reduce the flaming time of the board. Sodium carbonate has been found very effective for this purpose; it is readily applied and is low in cost. However, it cannot be used with board sized with the usual rosin sizing material. Rosin size, which is a mixture of rosin soap and free rosin, is precipitated onto the fibers by aluminum sulphate. Previous experiments in this laboratory (*1*) have shown that the optimum amount of aluminum sulphate to use with rosin size was enough to produce a hydrogen ion concentration of *p*H 4.5. Thus the finished board was decidedly acid in reaction. When the alkaline sodium carbonate was applied to the surface of a board, the waterproofing action of the sizing material was largely destroyed. Since both high water resistance and fire resistance are properties desirable in an insulating material, it appeared that the development of an alkaline or neutral sizing material would be a worth-while contribution to insulating board production. Insulating boards were, therefore, made from steamed cornstalk pulp, varying the sizing materials added before formation. All boards were made on a laboratory sheet machine producing boards about one foot square and one-half inch thick. It is expected that part of this work may be repeated later on semicommercial equipment.

The first attempt to secure alkaline or neutral sizing was to precipitate the usual rosin size with lime to give an insoluble rosin calcium soap with free rosin. Boards sized in this manner absorbed 50 per cent of their weight of water in a one-half hour immersion test. A well-sized board should not absorb more than 15 per cent water; samples commonly run 10 per cent or even lower. The failure to secure adequate sizing was blamed upon the low solubility of the lime. Because of its high solubility and low cost, calcium chloride was next tried as the precipitating agent, with the result that (a) board made with 2 per cent calcium chloride had a moisture absorption of 83 per cent; whereas (b) the use of 4 per cent calcium chloride resulted in a board having a moisture absorption of 62 per cent.

In all of the rosin sizing experiments, 3 per cent rosin size was used. This corresponded to the amount of rosin size found to give optimum results in previous work at the laboratory.

Effect of Wax Size on the Moisture Absorption of Cornstalk Insulating Board

Board No. 1	Per cent wax used	Per cent moisture absorption in ½ hour
1	2.0	30.7
2	4.4	18.7
3	5.5	13.0*
4	6.0	11.4
5	7.1	9.8
6	8.8	11.0

*Board only ¼ inch thick; other boards ½ inch.

With the failure to secure adequate sizing with rosin size, wax sizing was investigated. The use of wax emulsion sizes for insulating had been previously investigated in this laboratory (*2*).

In these experiments the emulsion was broken by the addition of sulphuric acid. The optimum hydrogen ion concentration for wax sizing, as for the rosin sizing, was shown to be *p*H 4.5. The optimum amount of sizing was 6 to 7 per cent equivalent to about 4 or 5 per cent actual wax. Since precipitating the wax upon the board fibers involves the breaking of the emulsion, it was decided to try to accomplish this by converting the soap used as an emulsifying agent from a soluble to an insoluble soap.

The wax emulsion used for sizing was made as follows: 300 cc. water, 3 grams of triethanolamine, and 9 grams of stearic acid were boiled gently with stirring. To this was added 88 grams of melted paraffin wax with vigorous stirring. The wax sizing emulsion was added to the pulp in the usual manner but was precipitated on the fibers by the addition of calcium chloride, 3 grams of calcium chloride to 25 grams of wax giving good results. It is believed that the amount of calcium chloride can be reduced considerably.

The results of the wax sizing are shown in the table. Two per cent wax produced a board having a moisture absorption in one-half hour of 30.7 per cent, which, while not satisfactory, shows definite sizing action. The absorption with 4.4 per cent wax was 18.7 which is still somewhat high. When 6 per cent wax was used, the sizing was excellent, there being an absorption of only 11.4 per cent. The hydrogen ion content of the white water (that is the water drained away from the board in the process of formation) was from *p*H 7 to 8 or nearly neutral. The wax emulsion precipitated by calcium chloride apparently provides the desired neutral or slightly alkaline sizing material needed for certain special board treatment. It has the disadvantage of costing about one dollar per 1,000 square feet more for ½-inch thick board, but for some purposes this extra cost may be justified.

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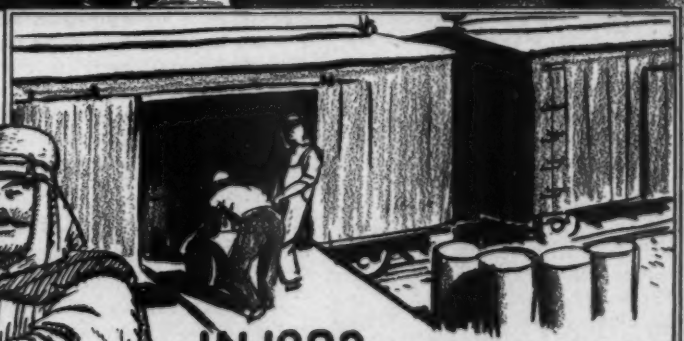
2) Sweeney, O. R. and L. K. Arnold. Studies on the Manufacture of Insulating Board. Bull. 136, Engr. Exp. Sta., Iowa State College (1937).

(1) Research associate professor and (2) former assistant research associate professor, Engineering Experiment Station, Iowa State College, Ames, Iowa.

PAPER SKETCHES

PAPER COLLARS WERE WORN BY NEGRO MOUNTEBANKS AND WANDERING MINSTRELS IN THE EARLY 1800's

ANIMAL GLUE WAS USED FOR THE SIZING OF PAPER FROM THE 14th TO THE 19th CENTURY. STARCH, WHICH HAD BEEN EMPLOYED BY THE ARABS IN THE 8th CENTURY, CAME BACK INTO USE WITH THE ADVENT OF THE PAPER MACHINE.



IN 1892, THERE WERE THREE AMERICAN FACTORIES WHICH WERE TURNING OUT 3000 PAPER BARRELS FOR OIL EACH DAY.

FIRST PAPER MILL IN THE UNITED STATES TO RECEIVE THE ARMY-NAVY "E" PRODUCTION AWARD WAS THE HAMMERMILL PAPER CO., ERIE PA. THE PRESENTATION WAS MADE ON SEPTEMBER 15th 1942.

ALLIED

AMMONIAS FOR USE IN SLIME CONTROL AGAIN AVAILABLE

Anhydrous and aqua ammonia are again available to the pulp and paper industry for use in slime control, according to The Mathieson Alkali Works, New York City. Many mills have experienced mechanical difficulties since last September as a result of the War Production Board order specifically prohibiting the use of ammonia in slime control; however, the recent release of ammonia for this purpose will alleviate the situation.

Mill supplies of chlorine will also go farther, as, when chlorine and ammonia are used together, only about half as much chlorine, or less, is required. All forms of ammonia are still under allocation and can be shipped only with WPB approval, but sufficient supplies for slime control purposes seem assured.

◆

ALLIS-CHALMERS PLAN WARTIME V-BELT DRIVES

A new plan just announced by Allis-Chalmers, Milwaukee, Wisconsin, would contribute an estimated equivalent of 250,000 pounds of crude rubber to the nation's stock pile.

Details of the new program and how it can be applied to representative applications are explained in the current issue of the company's publication *Texrope Topics*, copies of which are being distributed to thousands of users of V-belt drive equipment. In brief, the program calls for "wartime drives" using shorter center distances and larger sheaves on all new applications made in 1943. Walter Geist, president of the company and inventor of the multiple V-belt drive, states that "the plan is geared to present design limitations, and only slight changes in dimensions are necessary. He also stated that the plan should not be regarded as a temporary, wartime expedient, for the increases are sound and practical—in line with a long-range trend to larger diameters.

◆

LARGE CONSTRUCTION PROGRAM CARRIED ON BY S. O. CO. (IND.)

In his annual report to the stockholders, Edward G. Seubert, president of the Standard Oil Company (Indiana) stated that construction of manufacturing facilities completed or under way represent an estimated cost to the company and its subsidiaries of more than $55,000,000 which will contribute to the war effort. For the most part, this construction is being financed without aid from the Government.

According to Mr. Seubert's report, they will complete this year in the companies' refineries, certain alkylation and ismerization plants to make high octane aviation gasoline. In addition, the companies are building on their own account, two catalytic crackers of considerable size and two vapor recovery units to operate in connection with them.

◆

ABSENTEEISM MAY CAUSE WITHDRAWAL OF "E"

Unjustifiable absenteeism in plants may cause the withdrawal of the Army-Navy "E" award, according to a release by the Industrial Incentive Division, Navy Department. The Army-Navy "E" is given to industrial organizations for outstanding excellence in the production of war materials for the Army and Navy, and every six months after the award is made the Award Board reviews the record of the company to determine whether it shall be renewed or withdrawn. Principal causes for the withdrawal of the award, besides unjustifiable absenteeism, would be preventable slowdown in production as to quality or quantity and work stoppages in the plant. Several awards have been withdrawn for these reasons.

◆

NEW NAME IS AMERICAN BRAKE SHOE COMPANY

In the future the American Brake Shoe and Foundry Company, New York City, will be known simply as American Brake Shoe Company. The name has been shortened by vote of company stockholders at their 42nd Annual Meeting.

In explaining the change, William B. Given, Jr., president of the company, said, "We are merely legalizing a name by which we have long been known. Thus, oddly enough, our business friends sold us on changing our name, instead of our having to sell them on the need for a change, which is usually what happens when corporations adopt a new company title."

The company was founded in 1902 as a consolidation of several foundries which had been making brake shoes for railroads. Since then it has grown to the farflung American Brake Shoe Company of today, with its seven divisions, four subsidiaries, 58 plants located in 37 cities in 21 states and Canada. Having started as nearly 100 per cent railway supply, expansion to numerous other markets had, by the end of 1938, reduced that portion to well under 50 per cent. Currently the company's energies are centered almost exclusively on war production.

◆

WHITING COMPLETES SERIES OF EVAPORATORS

A series of eight calandria evaporators, 11 feet, 6 inches in diameter, have recently been completed by the Swenson Evaporator Company, Division of Whiting Corporation, Harvey, Illinois. These units will be part of an installation of quadruple-effect evaporators for salting conditions, and will be used in one of the country's major producers of heavy chemicals.

Below each calandria is a conical section which supports a long propeller shaft and a 3-bladed, 60-inch propeller. This propeller fits into the large central downtake of the calandria and is used to force the circulation of the liquor through the tubes.

◆

▶▶▶ A NEW NAME has been given to Robins Conveying Belt Company, Passaic, New Jersey. The name has been changed to Robins Conveyors, Incorporated. This change, however, is in name only; there is no change of management, corporate structure, or financial responsibility.

◆

H. K. FERGUSON CO. MARKS 25TH YEAR

The H. K. Ferguson Company is celebrating its 25th anniversary this year, having been founded in 1918, one of the first organizations in the United States to offer "a complete industrial service," consisting of designing, building, and equipping plants and factories ready for operation by their owners.

The company is still under the active management of its founder and only president, Harold K. Ferguson, who is credited with originating the "standard factory" principle building, developed during World War I when manufacturers were clamoring for additional floor space. He was able to guarantee delivery on plants and factories in from 45 to 60 working days by erecting buildings of standard design and construction and by being able to supply prefabricated steel girders.

During the intervening years the Ferguson Company has been associated with many different industries, including foundry, forge and machine tools, chemicals and allied products,

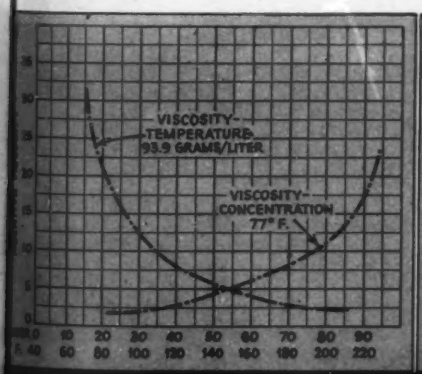
UNIFORM QUALITY CASEIN IMPORTANT TO *Dependable Coating Results*

THE MANUFACTURE OF HIGH QUALITY CASEIN calls for careful processing throughout each step. The first of these is to skim the milk (excess production over what is required for food), and treat it with acid to coagulate the casein. In this operation the temperature and the acid strength have important bearing on the succeeding operation as well as the quality of the final product.

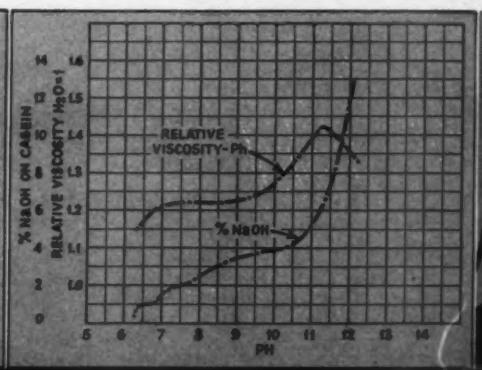
The whey must then be removed and the curd washed. In this step the time between precipitation and washing, plus the efficiency of the washing process itself, likewise affects the quality of the finished casein. Dewatering, grinding, and drying are operations that follow in that order, and each must be carried out with care to produce the best grade of material. When the casein is finally dry, ground, and packed, it is then ready for shipment.

SET GRADING STANDARDS—The casein produced by large manufacturing units is known as *prime* grade, since such plants are usually better equipped to exert the required careful control over operations that maintain uniform high quality. Much casein, however, is manufactured in small plants. This must be shipped to centralization points where it is then graded and blended to secure the desired uniformity. Such casein is designated as *standard* grade. The quality of casein therefore, depends not only on the care of the original producer but also on the skill and integrity of the blender.

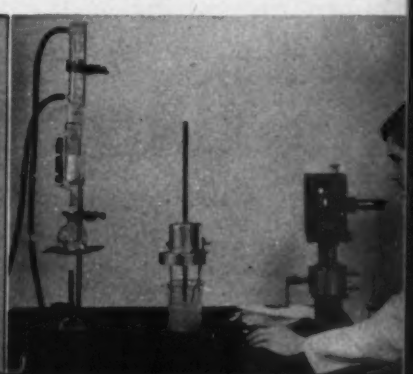
SELECTING SOURCE OF SUPPLY—Cyanamid, for example, has the proper facilities . . . the plant, skilled labor, and technically trained supervisory personnel . . . to assure the highest standard uniform quality production of casein at all times. All grades . . . muriatic, sulphuric, and lactic . . . as well as various blends of these three types, are available to meet your particular requirements. Since we have been compelled to depend solely on domestic production the supply of casein has not been plentiful, but we have put forth our best efforts to make shipments on schedule. When wartime conditions permit imports, we are exclusive agents for the well-known Dairyco Brand of Argentine casein. Your Cyanamid representative will be glad to discuss your requirements with you.



Curves showing relations of viscosity of NaOH casein solutions to concentration and temperature Viscosity H_2O = 1. Data of Chick and Martin.



Curves showing relation of pH of NaOH casein solutions (1% casein on the weight of water) to viscosity and amount of NaOH added. Data of Jacques Loeb.



In Cyanamid's Paper Chemicals Laboratory, Stamford, Connecticut, many improvements in casein processing have been developed.

American Cyanamid & Chemical Corporation

A Unit of American Cyanamid Company

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OTHER PAPER CHEMICALS

*Reg. U. S. Pat. Off.

food processing, paper and paper products, soap, automobile, rubber and synthetic rubber, and others. This month it has been awarded the Army-Navy "E".

◆

ALLIS-CHALMERS OFFERS "MAGIC OF STEAM" FILM

A new sound film entitled "Magic of Steam" has been produced by the Allis-Chalmers Manufacturing Company, Milwaukee, Wisconsin.

There is no advertising in the film. It describes, by means of simplified, animated drawings, the complicated mechanics of the steam turbine operation. It has been developed by the company for the use of men in Government and industry to increase understanding and appreciation of a machine essential in America's war production. The film runs for approximately 18 minutes and can be used on sound projectors only. If desired, 16 mm. prints of the film may be borrowed from the company.

◆

▶▶▶ A NEW NAME has been adopted by the Dixie-Vortex Company. Hereafter, it will be known as the Dixie Cup Company.

◆

SHELL & CANISTER COS. ANNOUNCE NEW CONTAINER

A new container, estimated to save tens of millions of pounds of essential metals annually, has been announced jointly by Shell Oil Company, Inc., New York City, and The Canister Company, of Phillipsburg, New Jersey.

A possible answer to the can shortage, as well as a new type package material for the future, the container is made up entirely of non-critical materials, including fiber, parchment paper, adhesives, etc. Shell Oil has already introduced the new material in initial quantities to the public as a motor oil package; however, it is practical for the packaging of other products, such as foods and liquids. Future detailed possibilities for use of the container in other fields are being developed by The Canister Company as a result of experience gained through the employment of the container as a package for petroleum products.

The new cans are now being introduced on a small scale in eleven markets, and it is announced that the new motor oil container will be in general use everywhere in the United States by the early part of the summer. Shell and Canister plan also, when production facilities permit, to make the container available to other petroleum marketers.

ARMY-NAVY "E" AWARDS

Dow Chemical Company, Midland, Michigan—The Texas Division of this company, located at Freeport, Texas, also the Dow Magnesium Corporation plant at Velasco, Texas, have just received the Army Navy "E" award. This marks the fourth "E" to be given to Dow-owned or operated plants since last December. The first award went to the Midland (Mich.) plant; the second was won by Dow's Bay City (Mich.) Division.

Farrel-Birmingham Company, Ansonia, Connecticut—A renewal of the "E" which has just been granted the Ansonia (Conn.) plant of this company, entitles each of the company's three plants — Ansonia and Derby, Connecticut, and Buffalo, New York — to fly the Army-Navy "E" with two white stars added.

H. K. Ferguson Company, Inc., New York City—For its part in designing and building the Rocky Mountain Arsenal, a large plant for Chemical Warfare Service at Denver, this company has been awarded the Army-Navy "E" pennant. The plant was in operation several months ahead of schedule and at a cost several million dollars under original estimates.

B. F. Goodrich Company, Akron, Ohio—Seven plants of this company have been cited for "excellence" and now fly the Army-Navy "E" pennant. The seventh to receive this award was the Los Angeles, California, factory. The company states this is the first Pacific Coast rubber factory to be awarded the "E."

Hammermill Paper Company, Erie, Pennsylvania—This company, the first paper mill to be awarded the Army-Navy "E," now proudly flies a flag with one white star — the symbol of renewal. Brief ceremonies were held for this occasion.

Manning, Maxwell & Moore, Inc., Bridgeport, Connecticut—On April 19, the Bridgeport (Conn.) works of this company held ceremonies to mark the presentation of the Army-Navy "E" award which was made by Admiral Thomas C. Hart, U.S.N. (Ret.). The following day, similar ceremonies were held when the Boston (Mass.) plant of the company was presented with the "E" award by Rear Admiral Wat T. Cluverius, U.S.N. (Ret.). At both presentations, the pennant was accepted by C. A. Moore, chairman of the board.

Pittsburgh Plate Glass Company, Pittsburgh, Pennsylvania—On April 30, the Thresher Varnish Company, Dayton, Ohio (a subsidiary) was awarded the Army-Navy "E" pennant with brief ceremonies at the plant. The pennant was presented by Major F. A. Christoffer, representing the Army; pins were presented to the employees by Lt. Comdr. J. M. Weldon, of the aircraft scheduling section of the Navy Air Corps. Charles L. Sullivan, Jr., president of the Thresher company, was master of ceremonies and the pennant was accepted by W. V. Simmons, treasurer of both the Pittsburgh and Thresher companies.

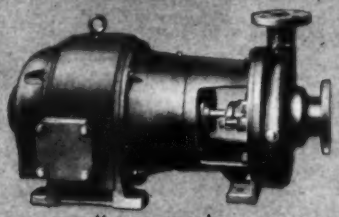
The William Powell Company, Cincinnati, Ohio—The Army-Navy "E" award for excellence was awarded to this company in a colorful ceremony at Music Hall, Cincinnati. Mayor Stewart, of Cincinnati, participated in the ceremonies. Rear Admiral H. G. Taylor, of the Navy, and Lt. Col. Paul J. Carr, of the Army, represented the Government.

Rice Barton Corporation, Worcester, Massachusetts—The award of the Army-Navy "E" pennant to this company was announced as this issue was closing. Presentation ceremonies were held May 7, but details could not be obtained.

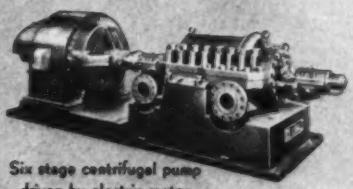
Sarco Company, Inc., New York City—On April 22, the Bethlehem, Pennsylvania, plant of this company was awarded the Army-Navy "E" pennant for excellence. The presentation was made by Rear Admiral F. A. Todd, U.S.N. (Ret.) and was accepted by Clement Wells, president, assisted by T. Napier Adlam, vice president.

Whiting Corporation, Harvey, Illinois—Several hundred guests assembled with the employees of this company on the afternoon of April 20 for the presentation of the Army-Navy "E" award. Col. John Slazek, deputy chief of the Industrial Division of Chicago Ordnance District, made the presentation which was accepted by Howard D. Grant, company president. Brig. Gen. Thomas S. Hammond, chief of the Chicago Ordnance District, and former president of the Whiting Corporation, presided as master of ceremonies.

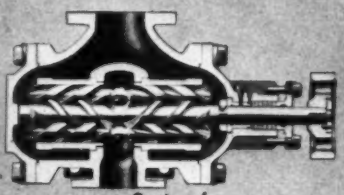
Single stage, double suction pump with motor drive



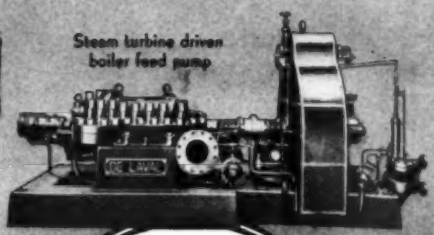
Motor-mounted pump



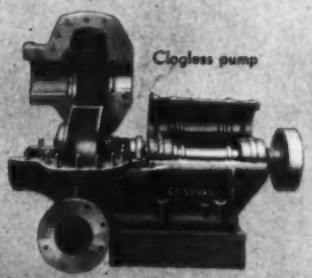
Six stage centrifugal pump driven by electric motor



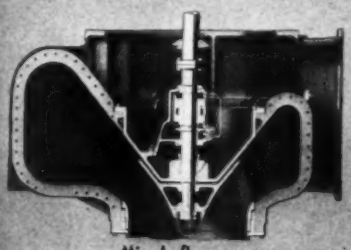
Section of De Laval-IMO oil pump



Steam turbine driven boiler feed pump

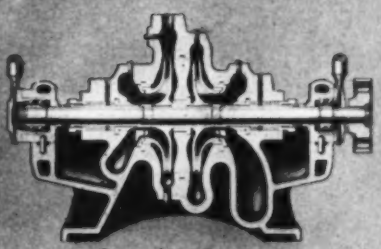


Clogless pump

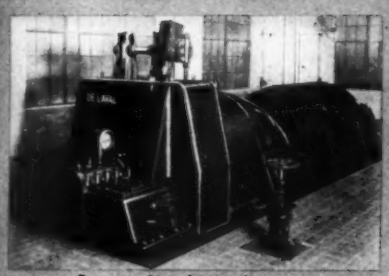


Mixed-flow pump

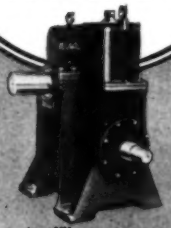
DE LAVAL *Products*



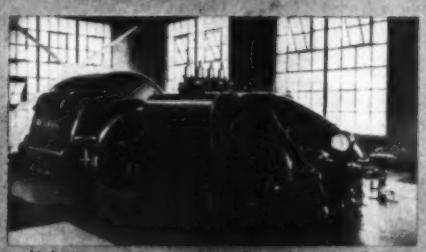
Opposed impeller pump



Steam turbine driving alternator

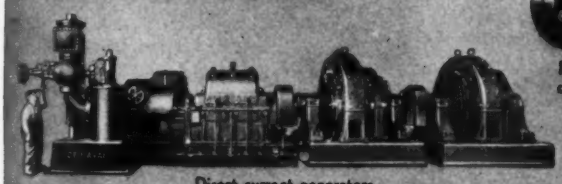


Worm gear

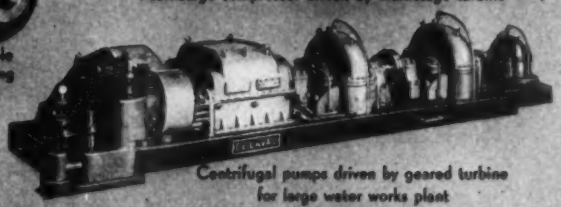


Multistage compressor driven by multistage turbine

Flexible coupling



Direct current generators driven by geared turbine



Centrifugal pumps driven by geared turbine for large water works plant

State requirements so that appropriate catalog may be sent.

3228

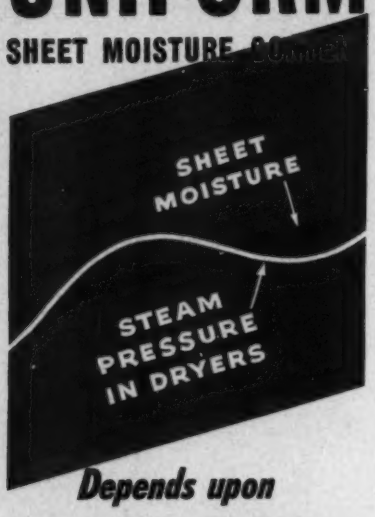
DE LAVAL *Steam Turbine Co.*

TRENTON, N. J.

MANUFACTURERS OF TURBINES: STEAM, HYDRAULIC PUMPS: CENTRIFUGAL, CLOGLESS, ROTARY DISPLACEMENT, MOTOR MOUNTED, MIXED FLOW, PROPELLER, PRIMING SYSTEMS; CENTRIFUGAL BLOWERS and COMPRESSORS, GEARS: WORM, HELICAL and FLEXIBLE COUPLINGS

UNIFORM

SHEET MOISTURE CONTROL



Depends upon

CONTROLLED

Pressure Changes

IF you are to get truly uniform sheet moisture content, steam pressure in your dryers must increase or decrease as moisture in the sheet increases or decreases. Maintenance of uniform pressure will not take care of sheet moisture variations, tending only to average out final moisture content.

The outstanding success of the Armstrong Stamm Moisture Control System lies in the fact that it automatically varies the pressure to produce UNIFORM moisture content throughout the sheet! This system is delicate in operation, yet ruggedly built and easily operated. Thoroughly proven in service, it is offered on a basis of satisfaction guaranteed. Complete information on request.

ARMSTRONG

ARMSTRONG-STAMM PAPER MILL ENGINEERING DIVISION

ARMSTRONG MACHINE WORKS
816 Hoffman St., Three Rivers, Michigan

ARMSTRONG MOISTURE CONTROL SYSTEMS

DRYER DRAINAGE SYSTEMS
GRADUATE TEMPERATURE CONTROLS
STEAM TRAPS • HUMIDIFIERS

ASSOCIATIONS

ANNOUNCE FIRST PLANS FOR SUPTS. CONVENTION

The 24th Annual Convention of the American Pulp and Paper Mill Superintendents Association, which will be held on June 15-17 at the Commodore Hotel in New York City, will feature a discussion of wartime problems facing superintendents and key operating men.

Tentative plans are now being made for the Convention to include addresses by outstanding authorities on the problems of manpower, pulpwood, pulp and other materials, and the new war uses for paper, paperboard, and converted paper products. Included in the discussion of manpower will be experience of the superintendents concerning the employment of women, the training of new employees, and the building of workers' morale. Group meetings will also be held at which papers will be presented, as well as specific questions and answers about practical pulp and papermaking subjects.

The "Get-Together Party" will be held immediately before the banquet on Wednesday night, June 16. The allied industries will be hosts at this social event. President Grover Keeth announced that the Board of Trustees had decided not to hold the proposed exhibit of paper in connection with the June Convention because of wartime difficulties involved.

◆

▶▶▶ AFTER A SURVEY OF the membership, the Southeastern Division of the American Pulp and Paper Mill Superintendents Association has announced that it has been decided not to hold a spring meeting of the division this year.

◆

ANNOUNCE DATES FOR 19TH EXPOSITION OF CHEMICAL INDUSTRIES

The 19th Exposition of Chemical Industries will be held at the Madison Square Garden, New York City, December 6 to 11, according to an announcement made by Charles F. Roth, manager of the Exposition.

The last Exposition, in 1941, was held at the Grand Central Palace; however, the U. S. Army has commandeered the exposition floors of the Palace as an induction center. This year all exhibition space will be on one huge floor; however, the actual amount of space available will be approximately one-half of that of the 1941 Exposition. Booth sizes will vary from 22x14 feet to 8x11 feet. A diagram of floor plans will shortly be available, and copies may be had from the International Exposition Company, 480 Lexington Avenue, New York City.

◆

EMPIRE STATE TAPPI AND SUPTS. ASSOC. HOLD JOINT MEETING

The joint meeting of the Empire State Section of the Technical Association of the Pulp and Paper Industry and the Superintendents Association of the Hudson River area, which was held at The Queensbury Hotel, Glens Falls, New York, on March 31 featured a technical talk and film.

L. R. Sherman, of the National Oil Products Company, spoke on "The Application of Emulsions and Emulsifiers to Papermaking." A picture, "Curves of Color," produced by the General Electric Company, was shown. F. J. McCourt presided, assisted by Foster P. Doane, Jr. The next meeting will be held on May 6, sponsored by the Marinette Paper Company, Glens Falls, featuring "Employee Relations and Training."

◆

CONVENTIONS AND COMING EVENTS

May 16—16th Annual Rock River Valley Safety Conference, Hotel Rogers, Beaver Dam, Wisconsin.

May 16-19—National Paper Box Manufacturers Association Silver Anniversary Convention. The Drake Hotel, Chicago.

May 22—Joint Convention of Northwestern Division American Pulp and Paper Mill Superintendents Association and Lake States Section of TAPPI, Conway Hotel, Appleton, Wisconsin.

June 15-17—National Convention of the American Pulp and Paper Mill Superintendents Association, Commodore Hotel, New York City.

STATED MEETINGS

Technical Association of the Pulp and Paper Industry.

Delaware Valley Section—First Friday of each month—Engineers' Club, Philadelphia.

Kalamazoo Valley Section—First Thursday of each month—Park American Hotel, Kalamazoo, Mich.

Lake States Section—Second Tuesday of each month—Conway Hotel, Appleton, Wis.

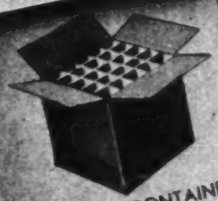
New England Section—Regular meetings of this group have been discontinued. The next meeting will be held in March.

The American Pulp and Paper Mill Superintendents Association, Inc.

Michigan Division—Third Thursday of each month—Park American Hotel, Kalamazoo, Mich.

PAPER plays an important role in AMERICA'S WAR EFFORT

CAMOUFLAGE PAPER


CARTRIDGE CONTAINERS

PAPER CARTONS FOR OILS, ETC.

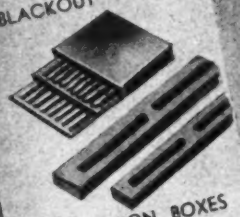
PAPER DRUMS

BLACKOUT PAPER

PAPER TO REPLACE BURLAP

PAPER TUBES

CARDBOARD FRUIT BOXES


AMMUNITION BOXES

KRAFT FOR WATER-PROOFING

PAPER BOTTLES

PAPER CANS

PLATES

WRAP FOR EDIBLES

DEHYDRATED FOOD CONTAINERS

PAPER LOAF PANS

Jones

E.D. JONES & SONS COMPANY-PITTSFIELD, MASS.

Builders of Quality Machinery for Paper Mills

SAFETY

GOVERNMENT TRAINING SAFETY SUPERVISORS

In reporting on the work of the War Safety Training Program of the United States Department of Labor, Secretary of Labor Frances Perkins stated that approximately 38,000 key supervisors have been trained to carry responsibility for the safety and health of war workers, and an additional 17,000 will be trained by July, 1944, to meet expected demands.

"The construction and operation of army camps, storage depots, ports of embarkation, and other facilities operated directly by the War and Navy Departments has created a further demand for safety leadership. Here again the War Safety Training Program is meeting the need," she said.

"There were not more than 10,000 industrial safety engineers in the entire country when we first began to arm against the Axis. By July, 1944, war plants will need some 55,000 key supervisors to carry responsibility for the safety and health of workers."

Copies of this progress report, "Training Safety Leaders," may be secured from the Division of Labor Standards, U. S. Department of Labor. The report describes the type of courses being offered under the program.

◆

AMER. STANDARDS ASS'N HAS NEW SAFETY CODE

A new Safety Code for Cranes, Derricks, and Hoists has been completed, according to the American Standards Association. The standard was developed for the protection of workers engaged in hazardous hoisting operations, and is another step toward conserving manpower and workpower for all-out war production of tanks, guns, and ammunition. It is the work of a representative committee of governmental, industrial, insurance, and technical experts, under the administrative leadership of the American Society of Mechanical Engineers, and the Bureau of Yards and Docks of the United States Navy Department.

◆

SAFETY SCORES

▶▶▶ In the annual paper industry safety contest, 10 mills of those participating report perfect scores for March. The mills with a no-accident record are:

Division I—Pulp and Paper Mills

Group A and Group B

(None)

Group C—

American Writing Paper Corp., Holyoke, Mass. (Riverside No. 2).

Group D—

Marathon Paper Mills Co., Ashland, Wis.

*Spaulding Fibre Co., Inc., Milton, N. H.

American Writing Paper Corp., Holyoke, Mass. (Mt. Tom Div.).

International Paper Co., Riley, Me. (Riley No. 23).

Alton Box Board Co., Carlyle, Ill.

Division II—Paper and Board (Re-manufacturing)

Marathon Paper Mills Co., Wausau, Wis.

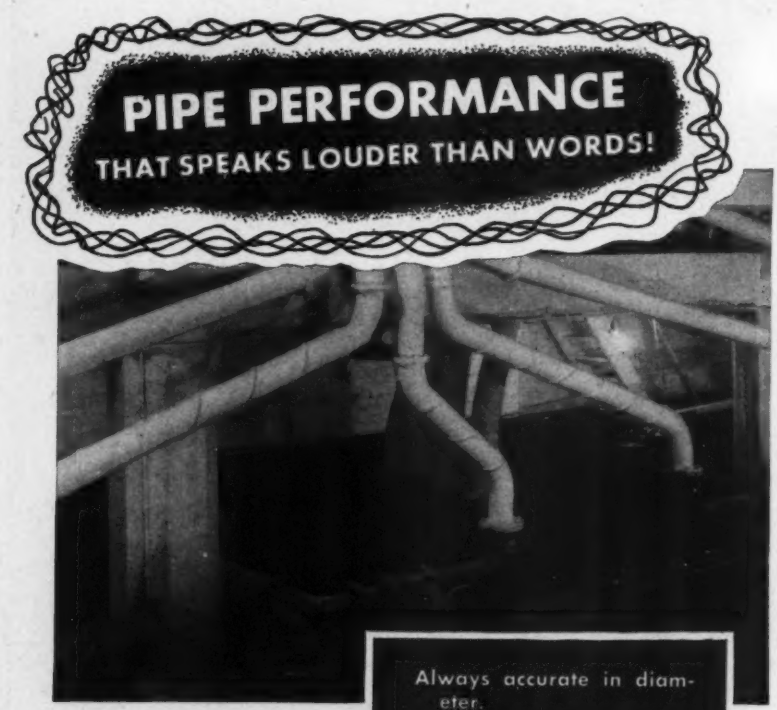
Thilmany Pulp & Paper Co., Kaukauna, Wis. (Bag Mill).

South West Box Co., Sand Springs, Okla.

Bay West Paper Co., Green Bay, Wis.

The paper industry safety contest is conducted among member mills of the Paper and Pulp Section of the National Safety Council, and runs for twelve months. The present contest covers the period July 1, 1942, to June 30, 1943.

*March report missing — covers eight months only.



ADVANTAGES LIKE THESE HAVE MADE NAYLOR THE IDEAL PAPER MILL PIPE

No other light-weight pipe can match Naylor in paper mill service. Naylor's exclusive Lockseam Spiralweld creates a reinforcing truss which permits the use of this distinctive pipe on jobs normally requiring heavier-wall pipe. Sizes from 4" to 30" in diameter with all types of fittings, connections and fabrication.

Write for Naylor Catalog.

Always accurate in diameter.
Concentric ends match correctly.
Holds true cylindrical form.
Easier to install.
Light weight saves steel.
Stays tight and leakproof.
Absorbs shock loads.
Cuts maintenance costs.
Saves money.

Naylor

NAYLOR PIPE COMPANY

1236 East 92nd Street, Chicago, Illinois

POWELL has the valves YOU need!

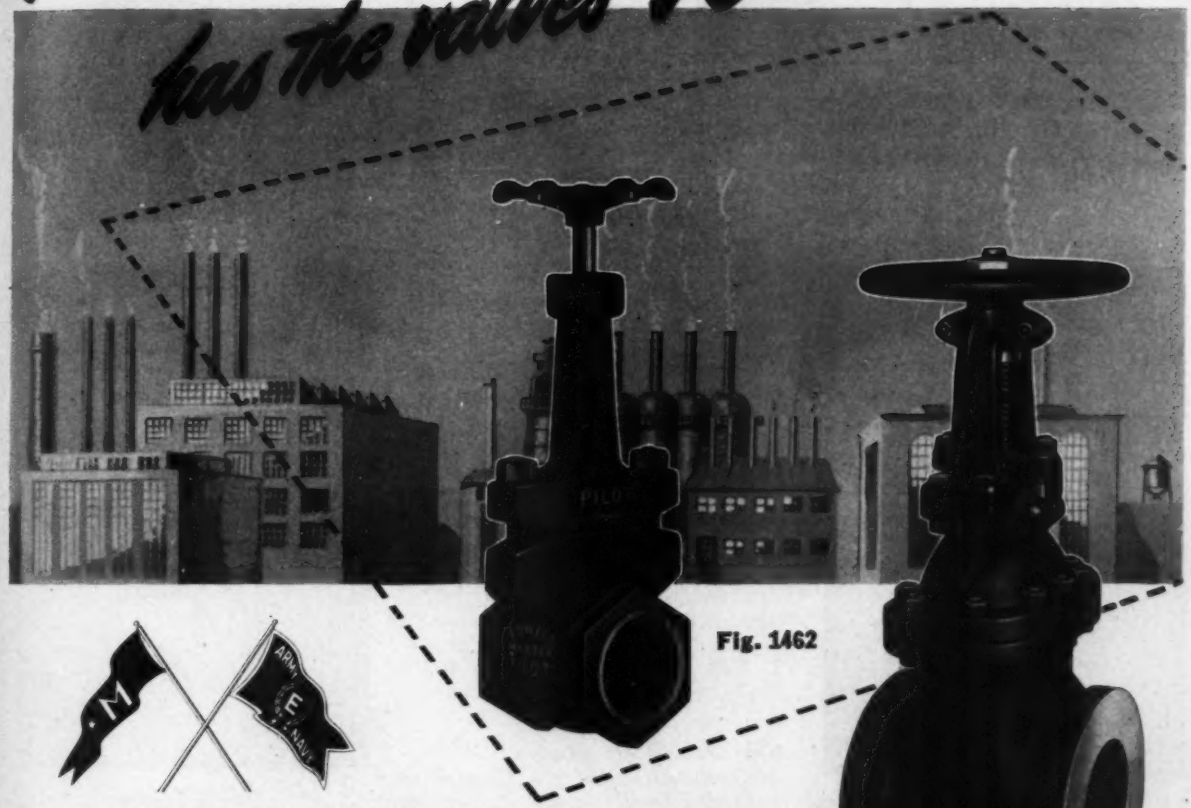


Fig. 1462

From 1846, when Powell started making valves, until the outbreak of the "Global War", the pace of industrial progress was constantly accelerating. One after another, with ever-increasing rapidity, new products and processes were being evolved. And as each became a reality, Powell was ready with the correct valves.

Since Pearl Harbor the rate of acceleration has reached a peak. And—as in the past—Powell Engineering has been meeting every challenge.* Let us help you with any valve problem you may have—Powell has the valve you need—or we'll design one for you.

*For the contribution we are making toward winning this War, we have been honored with the Army-Navy "E", the Maritime "M" and the Victory Fleet Flag.

The Wm. Powell Company

Dependable Valves Since 1846

Cincinnati, Ohio

Fig. 1816

Fig. 1816—All Iron "Model Star" Gate Valve for 125 pounds W. P. Flanged ends, outside screw rising stem, bolted flanged yoke, taper wedge solid disc. Also available with double disc—Fig. 1453.

Fig. 1462—All Iron "Master Pilot" Gate Valve. Screwed ends, rising stem, bolted flanged bonnet, taper wedge solid disc. Sizes ¼" to 2" for 150 pounds W. P.; 2½" to 4" for 125 pounds W. P. Also available in iron body, bronze mounted—Fig. 1460.

POWELL VALVES

NAMES *in the* NEWS

Personals

NEKOOSA-EDWARDS CO. HAS NEW DIRECTOR OF INDUSTRIAL RELATIONS

The Nekoosa-Edwards Paper Company, Port Edwards, Wisconsin, has just announced the appointment of

William J. Melville

William J. Melville as director of the department of industrial relations. Mr. Melville was formerly industrial safety engineer with the Employers Mutuals at Eau Claire, Wisconsin.

Franz H. Rosebush, who formerly handled all of the work of the department of industrial relations, is dividing his time with other duties, but he will continue to assist in the safety work for the time being.

◆

FRANK O'NEIL MADE V. P. OF LINK-BELT

Frank S. O'Neil, general manager of the Indianapolis operations of Link-Belt Company, has been promoted to the position of vice president. He succeeds James S. Watson, vice president, Indianapolis, who has just rounded out 50 years of service, and plans to retire from active duty at the end of this year, meanwhile continuing as a director of the company.

Mr. O'Neil joined the Link-Belt organization at the company's Pershing Road plant in Chicago, where he worked in the foundry, machine shop, cost department, and rate setting and production departments. He was transferred to the Indianapolis plant in 1916, where he successively served as assistant superintendent in charge of malleable iron chain assembly, superintendent of the Ewart plant, assistant general manager of both Ewart and Dodge plants, and as general manager since 1939. Mr. O'Neil's headquarters will continue to be at 220 South Belmont Avenue, Indianapolis.

◆

▶▶▶ Former advertising manager of the A. P. W. Paper Company, of Albany, New York, *George L. DeSola* has joined Anderson, Davis & Platte, Inc., New York advertising agency, as an account executive.

◆

▶▶▶ Following a recent meeting of the board of directors, SKF Industries, Inc., Philadelphia, has announced three executive promotions: *Thomas W. Dinlocker* was elected vice president and treasurer; *Richard H. DeMott,* vice president in charge of sales; and *C. P. Collins,* secretary. *William L. Batt,* vice chairman of the War Production Board, remains president.

◆

▶▶▶ Former vice president and production manager of the Champion Paper and Fibre Company, Hamilton, Ohio, *Reuben B. Robertson, Jr.,* has been commissioned as captain. He has been with the Army Service Force for several months. Previously he was with the WPB in Washington. His headquarters will be in Washington.

Reuben B. Robertson, Jr.

TESTIMONIAL LUNCHEON GIVEN R. S. KELLOGG

The Newsprint Service Bureau and its secretary, Royal S. Kellogg, have completed twenty-five years of service to the newsprint industry. In 1917 Mr. Kellogg established the Bureau along its present lines in New York City.

The valuable work carried on by the Bureau during the past twenty-five

Royal S. Kellogg

years has been attributed largely to the spirit and experience of its secretary. Throughout his administration, he has made the Bureau a veritable cornerstone of the newsprint industry, and he enjoys the confidence and high esteem of the entire papermaking industry.

In honor of this silver anniversary, a large number of prominent paper manufacturers of the United States and Canada gave a testimonial luncheon for Mr. Kellogg at the Waldorf-Astoria Hotel in New York City on April 13. Arthur L. Hobson, president of the Newsprint Service Bureau presided and Mr. Kellogg was presented with a watch and a motion picture camera.

◆

DR. SCHOENFELD HEADS GOODRICH'S CHEM. DIV.

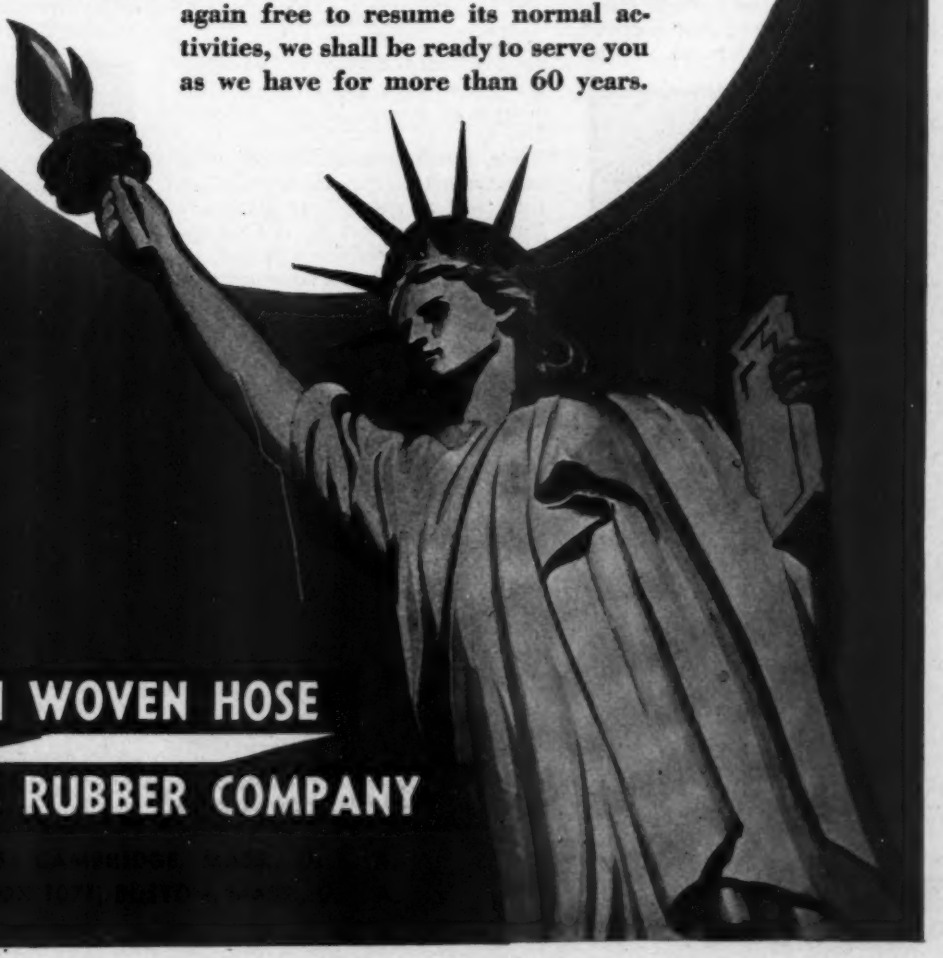
The appointment of Dr. Frank K. Schoenfeld as technical superintendent of the chemical division of The B. F. Goodrich Company, Akron, Ohio, has been announced. He succeeds Dr. Robert V. Yohe, recently named manager

The Spirit OF FREEDOM HAS YET TO BE CONQUERED

It has survived centuries of despotic onslaughts. But this war is the first attempt to force free men to surrender their freedom in exchange for the privilege of becoming slaves.

And rubber, one of the most essential commodities in the whole war effort, is playing its vital part in the battle for freedom.

Civilian needs, it is true, may have to be put aside for the time being, but when victory is won and the world is once again free to resume its normal activities, we shall be ready to serve you as we have for more than 60 years.



BOSTON WOVEN HOSE & RUBBER COMPANY

of the Kentucky synthetic rubber plant operated by the company for the Government.

Dr. Schoenfeld has been with B. F. Goodrich since 1927. He has specialized for many years in the development and application of Koroseal, a rubber-like plastic created in the company's laboratories, and for several years, he has been in charge of the Koroseal research and development laboratories.

Dr. Schoenfeld is a native of Pittsburgh. He received his bachelor of science in chemistry degree from the University of Michigan, and his master and doctor's degrees from Western Reserve University.

◆

CARRUTH LEAVES BROWN CO.—NOW V. P. UNION BAG & PAPER CORP.

A recent announcement from the Union Bag and Paper Corporation's executive offices in New York City, states that Henry P. Carruth has joined that organization as executive vice president.

Mr. Carruth has been vice president of the Brown Company in Berlin, New Hampshire. He joined that company in 1936 as general manager for the

Henry P. Carruth

Trustees. He remained in that capacity until 1941, and in the reorganization of the company at that time he became vice president.

In 1906 Mr. Carruth entered the paper industry. He later became vice president of The Mead Corporation and president of its subsidiary, Dill & Collins. He is a member of the Pulp and Paper Industry Advisory Committee of the War Production Board.

J. W. HADDOCK IS NEW PRESIDENT OF FARREL-BIRMINGHAM

John Wolcott Haddock has been elected president of the Farrel-Birmingham Company, Inc., of Ansonia, Connecticut, and Buffalo, New York. Formerly vice president of the Sulli-

J. W. Haddock

van Machinery Company of Claremont, New Hampshire, and Michigan City, Indiana, he assumed his new duties on May 1.

Mr. Haddock started his industrial career as a stock clerk in the Michigan City plant of the Sullivan Machinery Company, later working as shop apprentice, clerk, and assistant production manager before being transferred to the Claremont plant. From there he went to the company's New York City office as salesman, then to the general offices in Chicago as assistant to the general sales manager, and later became assistant vice president in charge of sales.

In 1935, Mr. Haddock was made general manager of the Michigan City division, with complete charge of the plant and the engineering, manufacture, and sales of its products. He has been vice president in charge of engineering and sales for the company since 1938, and divided his time between the Claremont and Michigan City plants.

◆

DR. DOW CHOSEN BY COLUMBIA UNIVERSITY AS CHANDLER LECTURER

Dr. Willard Henry Dow, president of The Dow Chemical Company, Midland, Michigan, has been selected by Columbia University as the Chandler lecturer and medalist for 1943. The citation accompanying the award named Dr. Dow as "one of the outstanding industrialists of the present generation" and noted as particularly spectacular "the achievements of the company in producing bromine and magnesium from sea water and of synthetic plastics and rubber."

Dr. Dow was graduated from the University of Michigan in 1919 with a Bachelor's degree in chemical engineering. Two years later the University of Michigan conferred upon him the honorary degree of Doctor of Engineering. After finishing at Michigan, he went to work in his father's plant as a chemical engineer. In 1922, he was named a director of the company. From 1926 to 1930 he served as assistant general manager; and in 1930, upon the death of his father, Dr. Herbert Henry Dow, he became president and general manager. In 1941, he assumed additional duties as chairman of the board.

The Chandler Lecture Foundation was established in 1910 in honor of Professor Charles Frederick Chandler, a pioneer in industrial chemistry and one of the founders of the American Chemical Society. Its purpose is to secure from time to time lecturers eminent in the field of chemistry and to

Dr. Willard H. Dow

reward their achievements with a medal. Dr. Dow is he twentieth lecturer and medalist so far honored. His lecture is tentatively scheduled at Columbia on May 20 on a subject yet to be announced.

◆

▶▶▶ Price & Pierce, Ltd., New York City, has granted a leave of absence to *William B. McGoldrick* so that he may go with the OPA as chief of the industrial paper unit of the Paper and Paper Products Division in Washington.

J. S. SNEDDON MADE V. P. CHARGE OF SALES H. K. FERGUSON CO.

J. Stuart Sneddon has been appointed vice president in charge of sales for The H. K. Ferguson Company, of Cleveland and New York City. His appointment became effective May 1.

Mr. Sneddon has been in charge of construction for the company during the past year, however, Clarence McDonough, who has been assigned to special work in connection with the synthetic rubber and ordnance plant construction handled by the firm, will resume his former position as vice president in charge of construction.

A graduate of Massachusetts Institute of Technology, Mr. Sneddon began his career in the construction field in 1910 as assistant superintendent for S. Pearson & Son of London on the New York State Barge Canal. Just prior to joining Ferguson, he was vice president of American Type Founders.

◆

▶▶▶ The many friends of *Captain L. L. (Buster) Griffiths, Jr.*, will be pleased to learn that he has been assigned to active duty at the Edgewood Arsenal, Maryland, where he will enter the Officers Replacement Pool. Captain Griffiths enlisted in the Army in 1942, and received his commission in the Chemical Warfare Service the first of this year. For the past four years, he has been with the Williams Gray Company, Chicago; previously he was with Heller & Merz.

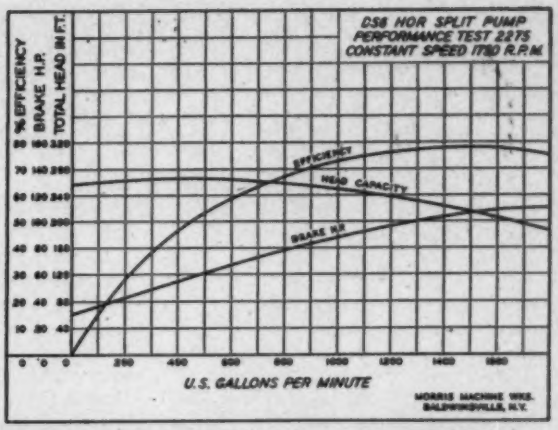
◆

JOHN STRANGE HAS RESIGNED FROM WAR PRODUCTION BOARD

A. G. Wakeman, director of the Pulp and Paper Division of the WPB, announced the resignation of John G. Strange as chief of the War Products Development Section, Pulp and Paper Division of the WPB. This announcement on May 5 also carried the information that Mr. Strange will be succeeded by R. J. Zaunmeyer, of the Kimberly-Clark Corporation, Neenah, Wisconsin.

Mr. Strange, who set up the War Products Development Section and has acted as its chief ever since, will return to his duties as secretary of the Institute of Paper Chemistry, Appleton, Wisconsin, but he will continue to serve as a consultant to the Section on the development of some of the forty special paper projects designed to meet war requirements.

Other changes in WPB personnel included the appointment of R. C. Spencer, of the Lowe Paper Company,



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. . . success is a matter of curves

Correct curves of impeller and casing waterway passages result in desirable performance curves of centrifugal pumps.

★ ★ ★ The efficiency curve should reach its highest point at rated operating conditions and should not fall off sharply at capacities above and below normal. The power curve should have a non-overloading characteristic so as not to overload the driver at any point of operation.

★ ★ ★ These and other advantageous features of Morris pump curves are described in bulletin which will be sent on request.

SEND FOR BULLETIN

MORRIS MACHINE WORKS — MORRIS — ESTABLISHED 1864 — BALDWINSVILLE NEW YORK

CENTRIFUGAL PUMPS

Ridgefield, New Jersey, as deputy chief of the Section replacing Herman Whitmore, who returns to active duty with the Robert Gair Company, New York. W. H. Swanson, another member of the Section, resigned after completing his temporary service to resume his activities with the Kimberly-Clark Corporation at Neenah, Wisconsin.

◆

▶▶▶ Assistant general manager of the Industrial Products Sales Division of The B. F. Goodrich Company, Akron, Ohio, *Burton F. Stauffer* celebrated his 50th anniversary with the company last month. He was honored at a luncheon of company executives and presented with a beautiful clock and other gifts by John L. Collyer, company president.

◆

▶▶▶ The appointments of *J. J. McIntosh* as southeastern sales representative and *B. F. Coombs* as Texas representative of Greene, Tweed & Company, New York City, were recently announced. Mr. McIntosh will handle Greene, Tweed products in the states of Alabama, Florida, Georgia, Mississippi, North Carolina, South Carolina, and also Tennessee east of Tennessee River. His headquarters will be at 1106 McLynn Avenue, Atlanta, Georgia. Mr. Coombs will cover eastern Texas and western Louisiana.

◆

▶▶▶ In celebration of his 80th birthday, *C. Jackson Booth,* president of J. R. Booth, Ltd., Ottawa, Canada, was presented with a beautiful bouquet of roses by the company staff. In acknowledging the presentation, Mr. Booth gave an interesting account of some of the events and experiences around Ottawa in the early lumbering days in that community.

◆

▶▶▶ At a director's meeting of the New Haven Pulp & Board Company, New Haven, Connecticut, the following officers were elected: *William R. Shaffer,* chairman of the board; *Joseph S. Miller,* president; *William B. Calkins,* vice president; *Henry D. Fisher,* vice president, secretary, and treasurer; *Walter F. Daley,* vice president; *Julian H. Morgan,* assistant treasurer; and *Ellsworth W. Cowles,* assistant secretary.

Necrology

PETER C. BRASHEAR

Col. Peter Cominges Brashear, 75, chairman of the board of the Fort Orange Paper Company, Castleton on Hudson, New York, passed away on April 19. He had been associated with the company since 1910, having served as vice president, president, and chairman of the board successively.

Colonel Brashear was born in Stephensport, Kentucky, in 1867. He attended Hanover College, Indiana, and graduated in 1888 with a B.S. degree. Prior to becoming associated with the paper company in 1910, he was connected with several banking institutions.

He is survived by his widow and a daughter.

◆

CARL EVALD OMAN

Carl Evald Oman, vice president of The Smith & Winchester Manufacturing Company, South Windham, Connecticut, since 1905, passed away at his home on April 8.

A native of Sweden, Mr. Oman came to the United States in 1882. He became connected with Smith & Winchester as superintendent in 1899, retiring from active duties on July 1, 1937.

Mr. Oman is survived by four sons, one of whom, Carl W., is associated with The Smith & Winchester Manufacturing Company.

◆

▶▶▶ Injuries received when he was thrown or fell from a horse April 19 proved fatal to *Harold C. Webber,* chemist at the Morris Paper Mills, Morris, Illinois. Mr. Webber had been with the company since September, 1940, prior to which he had been associated with the Munising Paper Company at Munising, Michigan, as chemist. He is survived by his widow and two children.

◆

EUGENE O'BRIEN

Eugene O'Brien, 59, vice president and general manager of the Sterling Pulp and Paper Company, Eau Claire, Wisconsin, passed away April 11.

Mr. O'Brien is well known in the industry, having been connected with papermaking ever since his school days. His father, the late Eugene O'Brien, was also a veteran in the business, and it was when he was superintendent of the Dells Paper and Pulp Company that young Eugene went to work at the paper mill under him. He became assistant superintendent to his father, and when the latter died about 27 years ago, the son took over and had continued directing and operating the plant since. When the Davis interests sold the paper mill property and business to Ely Meyer, of Tampa, Florida, in 1934, it became the Sterling Pulp and Paper Company, and one of the conditions of the transfer was that Eugene O'Brien remain as superintendent of the plant.

Surviving Mr. O'Brien are his widow, two sons, and three daughters.

◆

▶▶▶ A former paper manufacturer in Czechoslovakia, *Dr. Oswald R. Gellert,* passed away April 20 in New York City. Dr. Gellert was 54 years old, and had been residing in New York. His widow, four sons, and a daughter survive.

◆

ARTHUR W. McEWAN

Arthur W. McEwan, president of McEwan Bros. Paper Mills, Whippany, New Jersey, for nearly 40 years, passed away on April 20, at the age of 71.

Known as the inventor of a process for manufacturing boxboard from old newspapers, Mr. McEwan was the last of seven brothers of a family who had been papermakers for more than 100 years, comprising four generations. He was the son of the late Robert McEwan, who moved his paper mill from Caldwell, New Jersey, to Whippany in 1900.

He is survived by his widow.

◆

▶▶▶ Manager of the Chicago office of the American Tissue Mills, South Hadley, Massachusetts, *James F. Dean* passed away on April 23. Before becoming manager of the Chicago office, Mr. Dean was assistant traffic manager of the Massachusetts branch of the company. He is survived by his widow, one daughter, and two sons. One of his brothers, Henry W. Dean, is connected with the sales department of American Tissue in Chicago.

◆

JOHN L. NOLAN

At his home in Niagara Falls, New York, John L. Nolan, general superintendent of the local plant of the International Paper Company for the past twelve years, passed away at the age of 54.

Mr. Nolan was born in Menominee, Michigan, but New York state became his home when just a boy. His father, Martin L. Nolan, was then superintendent of the Diana Paper Company, Harrisville, New York.

Surviving are the widow and seven children. One son, Lieut. John F. Nolan, is serving with the armed forces overseas.

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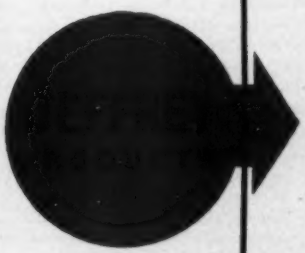
This paper mill installation is typical of the complete conveyor service that Jeffrey can render . . . for any type of manufacturing or power plant. Jeffrey material handling units are rugged . . . dependable . . . and are engineered to speed production through various processes. Back of all Jeffrey products are over sixty-five years of experience in catering to the needs of industry.



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JEFFREY
MATERIAL HANDLING EQUIPMENT

Free China's Paper Industry*

CHARLOTTE R. BUDD
Division of Industrial Economy
Bureau of Foreign and Domestic Commerce

▶▶▶ BIRNAM WOOD'S triumphant march to Dunsinane[1] finds a modern parallel in the amazing trek of Chinese manpower, transporting factories, piece by piece, from invaded coastal towns to China's undeveloped interior. The 14 mechanized paper mills now operating in Free China, though unquestionably small as compared with paper industries in other countries of similar size and population, are a definite contribution to the industrialization of the interior, made possible by the courage and perseverance of several million Chinese refugées.

Originally most of China's paper industry was located in Shanghai, which, being an educational and industrial center as well as the principal seaport, formed one of the best paper markets. Before hostilities began, there were 26 machine-equipped mills in China, a large proportion of which were in the vicinity of Shanghai. When the Japanese invaders swept in, 90 per cent of China's machinery fell into their control. The retreating refugees salvaged as much of their equipment as they could, but preservation of industrial plants meant dismantling of the mills already established near the seaboard, practically under the artillery fire of the enemy and smuggling the machines away by night. Motley processions, heading inland with their strange burdens, included old men; bewildered farm boys, uprooted for the first time from their native Province; youthful students; craftsmen; mechanics; laborers.

Szechwan Province, rich in forests and sugarcane fields, offered a welcome opportunity for the thousands of refugees. Glad for the calm, clear skies free of enemy flying ships, they again set up their machinery. After technical obstacles of the most discouraging sort were overcome, wheels began to turn again and a paper industry sprang up where none had been before. Of the 14 paper mills now operating in Free China, 7 were established in this area, most of the industry centering in the western part of the Province where bamboo grows in abundance. These mills, having a total capital of 12,000,000 yuan, produce writing, printing, and tissue paper, in addition to newsprint and cardboard. Their monthly output is 505 metric tons. "Free China's" total paper output in 1940, including the native hand-made product, came to 10,000 metric tons.

The mountain-protected area of Chungking provided sites for three modern paper mills having a capacity of approximately 200 metric tons of newsprint a month. According to latest available reports, these mills are not operating at their maximum capacity, since only a portion of the equipment has been installed and some difficulty has been experienced in the transportation of raw materials. Through bitter experience with the enemy, the Chinese have learned the wisdom of storing away some of their equipment in safe places, in case the machinery in use should be destroyed by aerial bombing.

It is not large, by Western Nations' criteria, but it plays a significant role in fighting China, where, in modern plants or crude dugouts, in menaced factories or ruined hamlets, it embodies the Chinese qualities of patience, resolution, and skill.

The Outstanding Enterprises

China's largest mechanized paper mill, the Lung Chang Co., established in 1906, was formerly located in Shanghai. It originally had two 100-inch American machines. With considerable difficulty it was moved to Chungking, Szechwan, and under a subsidy from the Ministry of Economic Affairs, started production in January, 1941, with a monthly capacity of approximately 150 metric tons of newsprint. Machinery was available for a 260-ton capacity, but a portion was withheld in case of bombing. Using cloth rags and waste of sugarcane as raw materials, the mill at first produced from 26 to 104 metric tons monthly. When it became difficult to obtain a sufficient supply of cloth rags, production was cut in half. In November, 1941, the Central Bank of China, under direction of the Ministry of Finance, ordered bank-note paper from the Lung Chang Co. It was, accordingly, reorganized, and paper production was resumed under Government management.

The Chi-Lu Co., formerly Szechwan's only mechanized paper mill, has recently been enlarged and equipped with Chinese-made machines. Its principal product is newsprint, made from grass and old newspapers. Production averages about 65 metric tons monthly. There is considerable demand for newsprint, since a number of newspapers have followed the National Government inland, the more important ones locating in Chungking. The present capital of Free China now boasts one monthly, two weekly, and five daily newspapers.

Haikow Plant

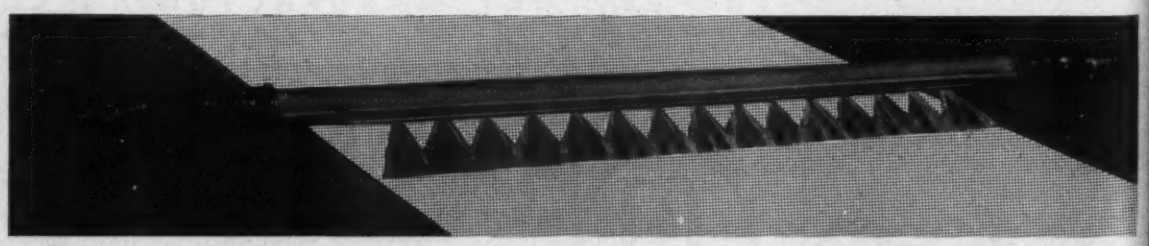
In the autumn of 1941 a new paper mill, which had been organized 2 years before, began production at Haikow. This mill has been working at its full capacity of 30 metric tons a month.

The machinery, second-hand, and originally of German construction, was brought from Shanghai. Power needed in its operation is obtained from the hydroelectric plant of the Yao Lung Electric Power Co. at Haikow. The raw materials used consist principally of rice straw, although small quantities of waste paper, scrap cloth, and rags also are used to make the better grades of paper. Rice straw is plentiful, but the supply of scrap paper and rags is limited.

This Haikow plant makes four grades of paper—ranging from medium to poor in quality. Since this is the only mill in the vicinity which manufactures paper by machinery, there is a great demand for its product, especially by printers, who in many instances are unable to use the coarser

(*) Abridged from article published in April 17, 1943, issue of *Foreign Commerce Weekly*.
(1) Shakespeare's *Macbeth*.

For SHOWER PIPES—Call Headquarters!!



BULLETIN 134 SANDUSKY FOUNDRY & MACHINE CO. Sandusky, Ohio

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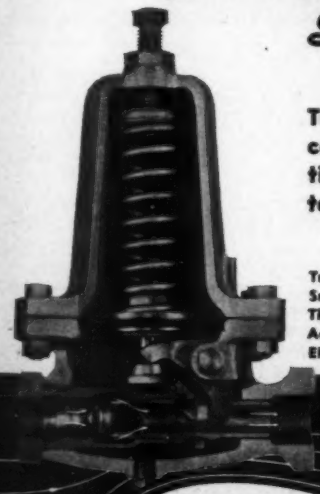
● Long life, and busy too, because this type "1000" valve does not fail—it's as dependable when production continues at high rate, like today, as when things are normal. Streamliners in thousands of plants these past years—and still serving well proves this. One user wrote, "We could not afford to take chances on time out for job repairs, that is why we used your valve on this job."

No trouble from lack of capacity with this valve! Even under peak load, or sharp changes in demand, the aspirating effect gets the valve wide open for maximum flow. Users know this and will vouch for it.

Write today for Bulletin 1000—eight pages of valuable valve facts.



Streamline Design means

LESS MECHANISM

The elimination of small ports and passages and complicated mechanism with but few close fitting parts gives you more in service and adds to the life of the "1000" valve.

NET RESULT TO YOU

- Trouble-free service
- Smooth operation
- Tight closure
- Accurate regulation
- Elimination of failures
- Constant delivery pressure
- No spoilage
- Practically zero in maintenance costs
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- Cost saving operation

Streamlined FOR SMOOTH, EVEN FLOW OF STEAM, WATER, AIR, OIL, ETC.

TURBULENCE ELIMINATED
The streamlined form of the inner valve produces the flow pattern shown here. It is the reason users of the "1000" valve get maximum capacity when it is needed most and accurate pressure control even when production hits non-stop proportions and operating conditions really are tough.

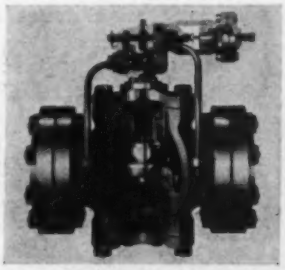
A. W. CASH COMPANY
DECATUR, ILLINOIS

CASH STANDARD
CONTROLS.. VALVES

A CASH STANDARD "GET ACQUAINTED" COLUMN

Question: "Don't you people make anything besides that Streamlined Valve you talk about so much?"

Answer: "Yes Sir; we do! And we propose to picture one or two of them here each time."



Cash Standard Type 11 Regulator, for use with water, air or any gas or oil that is non-corrosive. Pressure to actuate pilot valve may come from any source; and be as high as 1500 lbs. Variety of uses, notably as condenser water regulator.

Inlet pressure up to 600 lbs.; outlet pressure up to 250 lbs. Bodies: iron, bronze, steel. Trims: iron, bronze, stainless steel. Screwed, flanged, or ammonia type ends. Sizes: 2" to 12"

Cash Standard Type 8871 Pressure Reducing Valve; for use with liquids—especially dirty liquids, like Bunker C fuel oil for example. No sliding fits; inner valve bolted to diaphragm for positive movement.

Initial pressure up to 250 lbs., reduced pressure up to 200 lbs. Bodies: iron, bronze or steel. Renewable inner valve and seat ring, stainless steel. Sizes: ½", ¾", 1".

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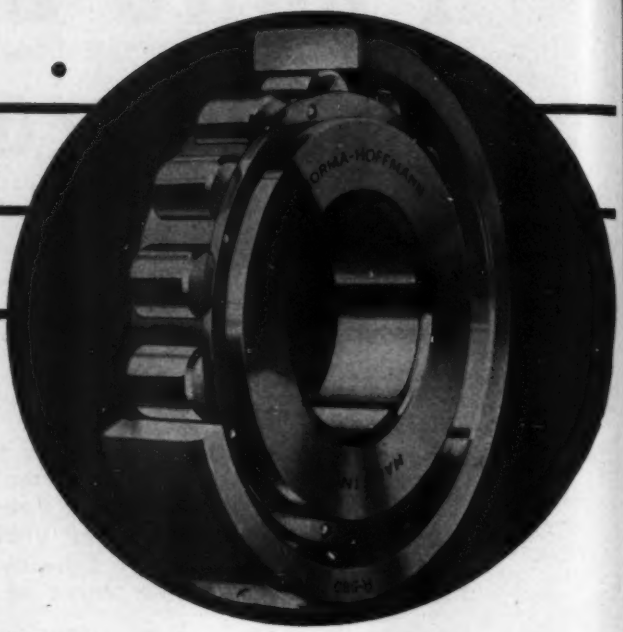

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varieties made by hand. The better type of paper made by this Yun Feng Co. has a slightly glazed surface, which permits printing on both sides of the sheet. Practically the entire output of the company is consumed locally, some of it going to one Kunming daily newspaper printed on small-sized sheets.

Great difficulty has been experienced in obtaining sufficient supplies of caustics used in bleaching. A small amount of soda is obtained from local sources, and about 4 tons of a 50 per cent solution of caustic soda is obtained from Chungking every month. The supply available, however, is not sufficient to produce enough white paper to satisfy the demand. Despite this urgent need, the Yun Feng Co. has no immediate prospects of expanding its production, in view of its inability to obtain sufficient supplies of caustics and additional machinery.

The Tungliang Experimental Paper Factory, located northwest of Chungking, is under the joint management of the Bureau of Industrial and Mining Readjustment and the National Resources Commission.

There is one paper mill in each of the Provinces of Kweichow, Shensi, Yunnan, and Kwangsi, and two in Kiangsi. A mill is in construction at Chekiang.

In Caves, Canyons, Temples

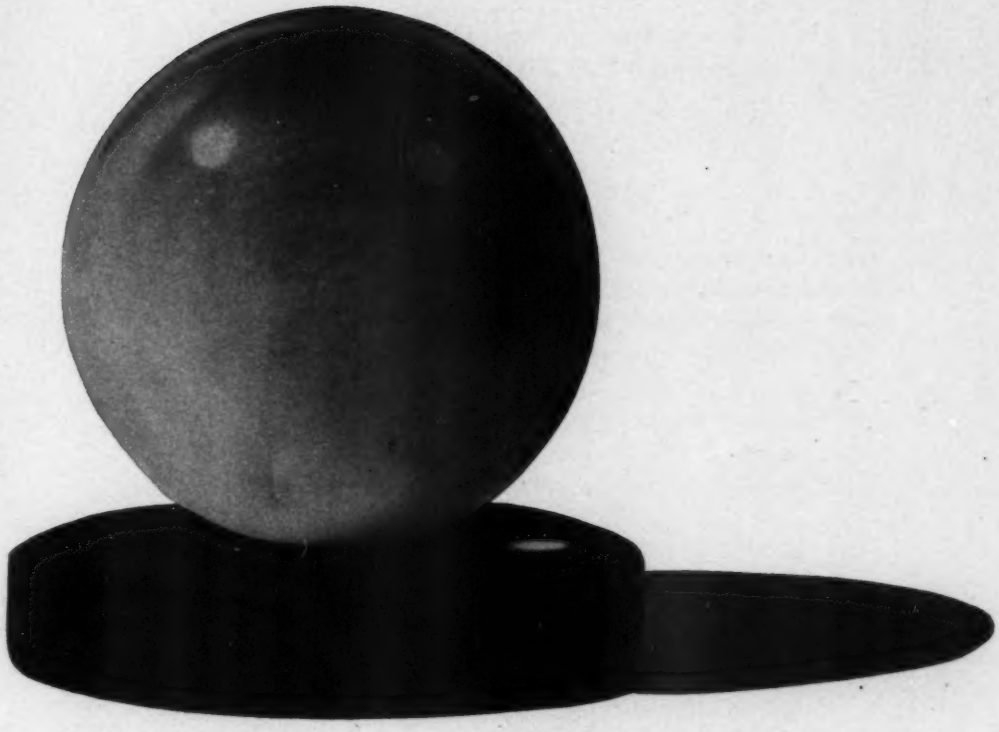
In addition to the mechanized paper mills in operation in "Free China," there are many small patriotic establishments producing paper by hand. Some of these carry on their industry in caves; others are housed in dugouts, canyons, deserted temples, and ruined villages, many of them perilously close to the enemy's firing line. These small establishments are part of a large organization which has adopted for its motto, "Gung-ho"—meaning "Work together!"

Most of these workshops, though handicapped by extremely primitive equipment, are supplying newsprint for local newspapers, wrappers for thousands of match boxes, as well as paper for students' inexpensive exercise books. The raw materials most generally used are: A local shrub ("Ko p'i"), the remains of old hemp sandals discarded by the Army, waste-paper scraps, and, for better grades of paper, bamboo imported from the south. In the autumn, when the shrub bark, which is used to make the white newsprint, becomes tough and leathery and unfit for use, the local news is likely to appear on paper made of any available material and dyed a startling shade of pink or green.

When the Japanese troops get too close to make operation practicable for the refugee craftsmen, they gather up their equipment and depart. When a safer location is reached, they set down their machinery and once more begin papermaking, so that China may be kept informed.

Small Native Plants

Scattered throughout the countryside, less than 100 miles northwest of Chungking, there are possibly 2,000 small, native paper establishments employing perhaps 100,000 persons, and producing paper amounting to as much as 1,000,000 yuan annually. Despite the ancient origin of



KEEP YOUR EYE ON THE BALL

The future is shaping up fast.

It takes no satin turban or fortune-teller's cards to see the coming events in tomorrow's crystal. They're with us already . . . more clearly defined with each new technological development, each new advance on the industrial front.

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Wyandotte men . . . with a mind ahead of the job at hand . . . are ready to help you take up the challenge that peace will bring. Experience in furnishing basic chemicals to half a hundred industries has gained them a bird's-eye view of business trends, an all-over picture which fits the pieces together, points up those destined to affect your plans.

Would such *full*-vision be useful to you? Then our technical staff is at your command. Wyandotte, though working 'round the clock to supply Victory's urgent demands, is never too busy to be of service.

Wyandotte Chemicals Corporation consolidates the resources and facilities of Michigan Alkali Company and The J. B. Ford Company to better serve the nation's war and post-war needs.

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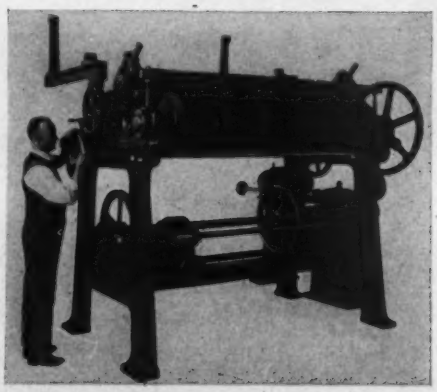

ROTARY SPOT CUTTER—All anti-friction bearings—for cutting preprinted rolls of paper to mark—manual or automatic photoelectric control.

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THE SMITH & WINCHESTER
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the paper industry in China, it has made relatively little progress in the interior of the country. Except for a few minor improvements, the native paper makers are still using pretty much the same processes as those used by their ancestors 1,000 years ago.

Rice straw, mulberry, bamboo, tsu tree, tan tree, hemp, cotton rags, and waste paper furnish the raw materials popularly used in native paper making. The most common type of paper in China is that made of rice straw sometimes mixed with stems of a reed known as "mao ts'as." A better grade of paper, which will carry ink, is made from bamboo. The best grade for writing purposes is made from the bark of the tan tree which grows to a height of about 12 feet. The paper mulberry tree, or "kou shu," 35 to 40 feet in height, with a smooth, dark-green bark, is found in all parts of China. In bush form it is abundantly distributed along the highways and is often found clinging to cliffs.

"Rice paper," preferred by Chinese artists and used also for making artificial flowers, is really not a paper at all, but thin slices of the pith of a shrub (*Fatsia papyrifera*).

The Government is encouraging the manufacture of hand-made paper. The Hunan Provincial government has authorized establishment of 12 hand-made paper mills and organized a corps of technical experts to revive this ancient handicraft.

Background of the Industry

The Tien Chang Mill at Shanghai is the oldest of the pioneer concerns in the Kiangsu Province to adopt mechanical methods. This company was started about 52 years ago by the famous Viceroy Li Hung-chang, under the name of the Lun Chang Paper Mill. It later assumed the title of the Pao Yuan Paper Mill, but was reorganized in 1924 under the present name, with capital of $400,000.

A modern paper mill was established by Americans in 1901 at Shanghai. In 1907 two technically proficient plants were erected by Chinese interests. Later several paper plants, subsidized by the Chinese Government, were set up in Hupeh, Kwangtung, Shantung, and Anhwei Provinces. Most of these were unsuccessful, however, and discontinued operation. In the years following, the Shanghai area became the center of China's mechanized papermaking industry.

In 1933, there were 20 modern paper mills working in Kiangsu Province, all Chinese-owned. About 2,000 Kiangsu workers were employed in the industry at that time, the most skilled receiving from $1 to $2 a day, though the average workers were paid only 40 to 70 cents. Larger concerns were fairly well equipped with papermaking machinery, including calendering machines, boilers, beaters, and breakers. Motive power consisted mostly of electricity or steam, although in some mills Diesel engines were installed.

Wood pulp, rice straw, and reeds were the principal raw materials used. Wood pulp was imported from the United States, Scandinavia, Germany, Japan (pre-"Incident"), Canada, and Ceylon.

The use of reed was an innovation of the Kiangnan Paper Co. Found in the marshy ground along the Yangtze River, the reed could be obtained at much lower prices than rags, rice straw, or imported pulp, thereby reducing substantially the cost of production.

Most of the paper products of the Kiangsu Province were consumed locally. Total domestic demands were not nearly satisfied, however, and 90 per cent of the machine-made paper used in various parts of China came from abroad.

Pre-Conflict Conditions

Before commencement of hostilities, paper held fifth place among China's total imports—somewhere in the neighborhood of $57,500,000 worth of paper being imported each year. By 1940, paper imports had dropped to eighth place. Paper shipments from Germany and the Baltic countries, which had formerly dominated the market, were sharply curtailed by the European war. After the spring of 1940, China's main sources of paper supply were the United States, Canada, and Japan (we are speaking now of China as a whole, Occupied as well as Free)—most of the paper coming from the United States and entering China through the port of Shanghai. In 1939, total imports of paper and paperboard from the United States amounted to 6,125 metric tons, valued at $445,216. In 1940, imports rose sharply to 33,865 metric tons valued at $4,394,386. Japan and Taiwan (Formosa) furnished

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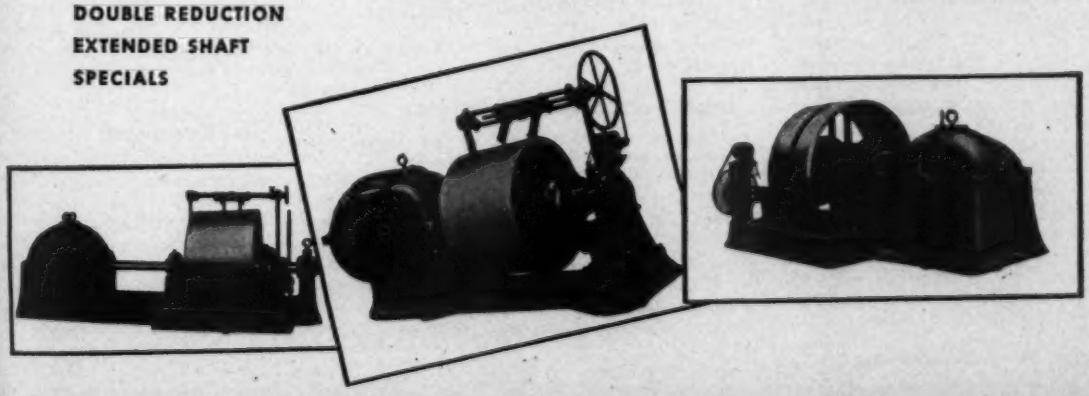

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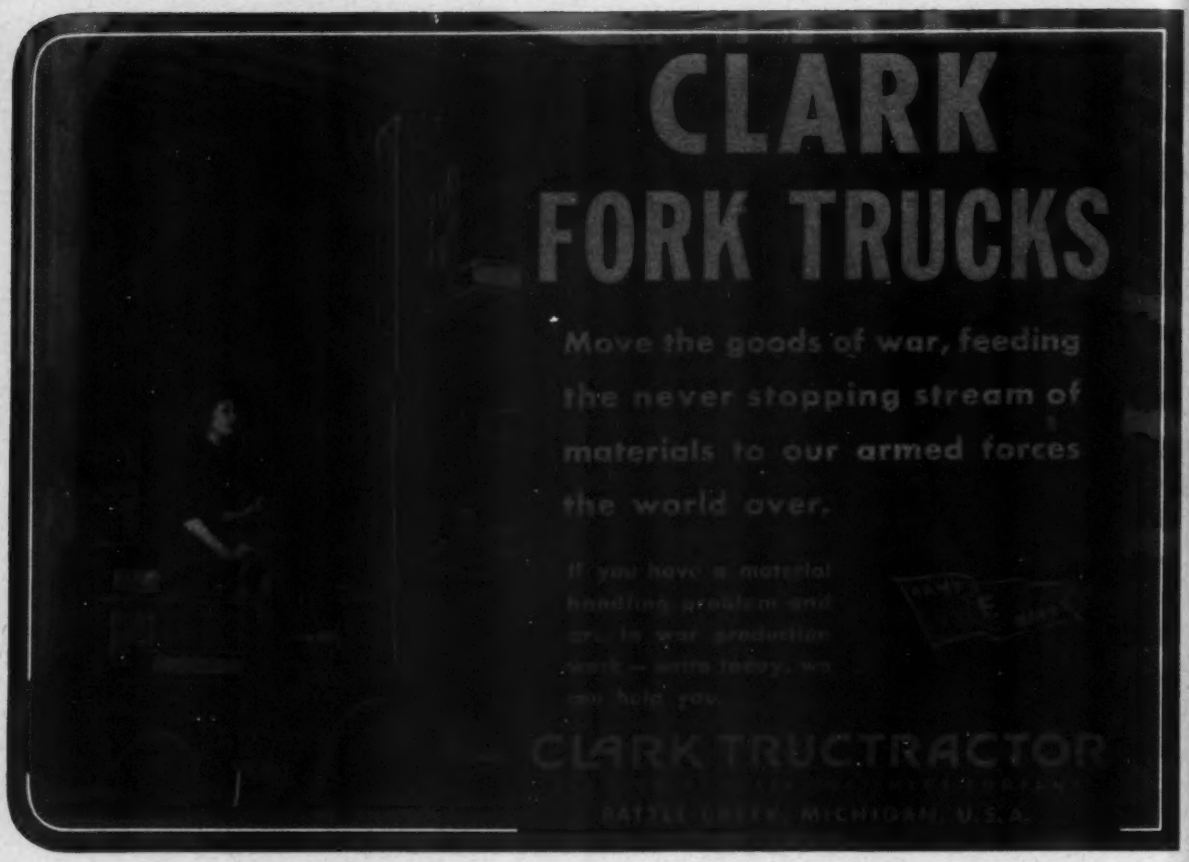

most of the manufactured articles, such as fancy boxes, decorations, and toys.

In August, 1937, 10 Chinese-owned mills, with a combined capital of 3,470,000 yuan and an annual turnover of 1,000,000 yuan, were operating in Shanghai. These mills produced 84 per cent of China's total output of writing and printing paper and plain glazed paper. Some 32 per cent of China's total output of paperboard, or 13,400 metric tons annually, was also manufactured by these mills. At that time, Shanghai had one Japanese mill and one American mill.

During 1937, the Kwangtung Provincial government erected a mechanized paper mill having a monthly capacity of approximately 1,300 metric tons of newsprint. This mill had its own pulp-making department, with facilities for treating about 3,000 metric tons of Chinese pine monthly. It is said to have been dismantled when it was seized by the enemy in October, 1938. According to some sources, this mill is still operating on a very small scale at Canton. Other reports are that the machinery has been shipped to Japan.

After the Jap Incursion

When hordes of Japanese came from the east coast in 1937, nine of the ten Chinese mills suffered serious losses. Four years, however, sufficed to bring about recovery of Shanghai's paper industry. In 1941, eighteen mills were operating in this area—eight owned by the Japanese, nine by the Chinese, and one American-owned. These mills produced in the aggregate 2,000 to 2,300 metric tons of paper monthly.

Time after time the Hwa Foong Mill at Hangchow and the Ming Foong Mill at Kashing have been dismantled. One 98-inch machine of British manufacture accounted for the Hwa Foong's monthly output of 650 metric tons of paperboard, and the Ming Foong Mill with its one 90-inch German machine had a capacity of 400 metric tons monthly. In addition to yellow and gray paperboard, made of rice straw and waste paper, this mill had been preparing to make white paperboard and cigarette paper.

Impact of Europe's Cataclysm

After the outbreak of war in Europe, imports of wood pulp from Scandinavian countries were negligible, whereas shipments from the United States and Canada showed considerable increases. In 1939 there were 1,102 metric tons of wood pulp imported from the United States, valued at $41,335. The following year wood-pulp imports from this country more than doubled, to 2,688 metric tons valued at $174,125.

By April, 1940, imports from Finland were completely cut off, and those from Sweden ended in June of the same year. During the first four months of 1941 all of the wood pulp entering Shanghai originated in Canada or the United States. One small shipment was brought from Russia's Siberian forests, but it was unsuitable for use in the existing machinery.

It soon became necessary for domestic mills to utilize pulp made from local waste paper, although this produced a short-fiber, low-quality product. The large quantities of rags previously exported from China to the United States are now being retained to supplement that country's own supply of waste paper in the manufacture of paper.

Foreseeing a rise in price and the curtailment of supplies of newsprint from Europe as a result of the war, Shanghai newspapers took the precaution of storing large stocks. Newsprint imports during 1940 decreased more than 38 per cent, compared with 1939.

The "Old-Newspaper" Picture

Old newspapers, supplied to China by the United States in large quantities before the war, had been distributed from Shanghai to interior points where there was an active demand for their use in the binding of walls, packaging of retail products, and making paper hats, shoe soles, and firecrackers. United States exports of this commodity to China decreased from 15,270 metric tons valued at $194,651 in 1939 to 1,357 metric tons valued at $27,243 in 1940. Japan ranked second to the United States as a supplier of old and over-issue newspapers to China (considered as a whole)—but this business has now fallen off tremendously.

Japs Active in East China

The Central China Paper Manufacturing

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1/2"	13,468,000	$1,481.44	1,219,280	$792.53	1,5[illegible],100	$243.86
3/8"	7,558,500	831.44	684,290	444.79	8[illegible],360	136.86
1/4"	3,366,990	370.37	304,820	198.13	[illegible],020	60.96
1/8"	824,570	90.70	74,650	48.52	93,310	14.93
1/16"	213,000	23.43	19,280	12.53	24,110	3.86
1/32"	52,910	5.82	4,790	3.11	5,99[illegible]	.96

Enlarged copies of this chart available on request; also for Lunkenheimer Catalog

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Co. was organized in 1940 by Japanese interests, capitalized at 20,000,000 yuan. Its announced intention was to establish new mills at Nanking and Tsinan and assume management of the former Chinese-owned Great China paper mill at Woosung.

Japanese manufacturers now supply Occupied China with paperboard, cigarette paper, coated or enameled paper, glazed and marbled paper, parchment, glassine, and printing paper. These are still being shipped in considerable amounts to Shanghai, despite restrictions in Japan governing export of various commodities to non-yen-bloc countries.

Paper plays an important part in the war effort, and even the comparatively small amount being produced in Free China today is of significant value to the United Nations.

Convention Papers . . . Abridged

Pipe and Tube Materials Survey in Sulphate Pulp Process

S. B. JONES, Engineer
West Virginia Pulp and Paper Co.

The Materials of Construction Committee of the Engineering Division of the Technical Association of the Pulp and Paper Industry appointed the Piping Materials Subcommittee to investigate the problem of the industry in connection with the conveyance of chemicals, vapors, pulp suspensions, and other fluids. It was decided to make a survey of the durability of materials used in the various operations of sulphate pulp making in conjunction with one covering packing materials (reported previously). A plan of procedure was developed with a form consisting of questions, to be applied to each operation as shown in Figure 1 (See page 186).

Application was made to and approved by the TAPPI research appropriations committee for funds to cover the expenses of the survey made by Vincent Waters, technical assistant to the secretary of TAPPI.

This is the third installment of abridgments of papers presented at the annual meeting of the Technical Association of the Pulp and Paper Industry, held in New York City, February 15-18, 1943. Monthly installments of these abridgments will appear in succeeding issues.

The survey covered the information reported by 18 plants, including one in Canada.

Figure 1 is a typical flowsheet of a sulphate pulp mill. The encircled numbers indicate the various phases of the operation of pulpmaking. These phases are described in the legends and used in the balance of this report.

1. *Digester Circulating Sulphate Liquor.* Wrought iron and steel were the materials reported in this service with the latter more common. The range of life was from 3 to 15 years; most installations lasted from 4 to 5 years. Low temperature liquor of 240 Fahr. as compared with the average of 340 Fahr. was associated with exceptionally long life. Scale was deposited by the liquor in about one-half the cases, but such scale apparently did not affect pipe life. There was no evidence that the flow rates had any particular influence on pipe life.

2. *Diffuser to Dump Chest—Brown Stock.* Steel is the only material reported being used. It has had a life range of from 2 to 10 years. There is no indication of the factors determining pipe life from the data supplied.

3. *Washed Stock to Process—Brown Stock.* Steel is the material predominantly used in this service, with some wrought iron, and one mill reporting wood. The average life is about 10 to 15 years. Corrosion is evidently not a serious problem.

4. *Weak Spent Wash Liquor Storage to Dump Chest—Weak Black Liquor.* Steel predominates in this service according to the report, but some wrought iron is used. Life of the pipe is from 6 to 15 years, frequently over 10 years. Corrosion is evidently not a serious problem.

5. *Strong Spent Liquor Storage to Evaporator—Strong Black Liquor.* Steel is reported more often in this service, but wrought iron is used also. The average life is from 5 to 15 years, with one case of unusually short life of one year. In the latter case the only connected factor appeared to be an unusually high flow rate through a 3-inch pipe with deterioration most rapid at bends. In other mills the pipe size for this rate of flow was above 4 inches.

Deposition of scale was rare.

6. *Steam Condensate from Evaporator—Water Contaminated with Black Liquor.* The most commonly used material in this service appears to be 3-inch steel pipe, with some reports of wrought iron, and of steel and wrought iron in sizes from 1½ to 6 inches. The average pipe life is from 1 to 10 years, and with no apparent connection between service conditions and life. Failures in one case occurred at bends, one at joints, and at miscellaneous areas for all others. No scaling was reported.

7. *Evaporator Effect Transfer — Weak Black Liquor.* The usual material reported in this service is steel pipe, in sizes from 2 to 12 inches, with one used of wrought iron reported. Piping life extends from 1½ to 6 years. Failures occur in no specific areas.

Scaling is evidenced only at the one mill reporting longest service life. Other serv-

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200	Wtg.	CS	220/440	580
150	Wtg.	CS	2200	1715
125	G.E.	I-K	2200	580
75	Wtg.	C	2200	1750
75	Wtg.	CS	220	1170
75	Wtg.	CCL	220	850
75	G.E.	KT	2300	900
75	G.E.	I-K	220	570
60	G.E.	K bb	220	1765
60	Wtg. vert.	CS	2200 (3)	1750
60	Wtg.	CS	220	435
50	Howell bb.	FBB	220	1725
50	L. Allis	KH	220	1140
50	G.E.	I-K	220	900
50	G.E.	I-K	220	720
50	Howell	SC	440	720
50	G.E.	I-K	440	490
40	Allis C.	AR	440	860
40	F. Morse bb.	H	2200	720
40	G.E.	KF gear type	2200	600
35	Wtg.	CS	2200	1170
35	G.E.	I-K	220/440	900
35	Allis C.		440	480
30	G.E.	KT	220	3450
30	G.E.	K	440	1760
30	Wtg.	CCL	220	1120
30	F. Morse		220	900
30	Allis Chal.	AN & AR	440	860
30	Wagner (3)	BW	440	850
30	Wtg.	CS 2-CCL	440	870
30	G.E. (3)	KT	220	690
25	Cleveland	MG-4-75	220	1200
25	Watson	KH	220	1140
25	L. Allis	KH	220	850
25	G.E.	KT	220	690
25	Wtg.	CS	220	570

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270 HP GE ATI 2200 v. 600 RPM unmt.

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190 HP E. Mchy. 440 v. 720 RPM 3-brg.

A.C. Generators

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125 KVA Wtg. 3400 v. 900 RPM.

120 KW G.E. ATI 2300 v. 720 RPM (2).

25 KVA F. Morse 2300 v. 1800 RPM.

200 KVA G.E. 240 v. 720 RPM.

Transformers

3—1000 KVA Kuhlman 1/60 2300 to 220 v.

2—200 KVA G.E. HT 3/60 4900Y-2300Y auto.

2—200 KVA G.E. H 1/60 4900/2300 to 115/230.

1—90 KVA Kuhlman 1/60 440/1.5/6 v. dry.

6—75 KVA Wtg. SK 1/60 2310/244/122.

2—75 KVA Wtg. S 1/60 2310/244/122.

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1—8½x5x10 Union Steam Pump Co. boiler feed pump, brass lined cylinders, with force feed lubricator.

Motor Generator Sets

1—750 KW 4 bearing synchronous motor generator set, Elliott type 4016LB, 275 v., compound interpole, D.C. generator, model 40A-A01, direct connected to 110 HP Westinghouse model S974D294, 3 phase, 60 cycle, 440 v., 900 RPM, 0.9 P.F., A.C. motor.

1—250 KW General Electric type MPC, 600 v. D.C. with 300 HP General Electric induction motor.

1—300 KW Westinghouse type S629D221, 3 pedestal bearing synchronous M.G. set, 220 v., shunt interpole, direct connected to 450 HP, type 3E63, 3 phase, 60 cycle, 2300 v., 1200 RPM, 90% P.F., A.C. motor.

1—300 KW Ridgway, 275 v., D.C., 720 RPM, with synchronous motor, 3 phase, 60 cycle, 2300 v., design 34P94.

3—300 KW Allis Chalmers, 600 v., D.C. generators, with 3 phase, 60 cycle, 2300 v. motors, synchronous, speed 600 RPM.

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ice conditions appear to have no direct bearing on life.

8. *Evaporator Effect Transfer—Intermediate Black Liquor.* Steel is most commonly used material, with two reports on use of wrought iron and one of 5 per cent nickel steel. Common sizes are from 2 to 6 inches, with some reports on the use of 1½ to 8 inches. Average life is from 1 to 6 years. Failures are reported at the bends, joints, pipe ends, and in scattered areas.

Scaling is reported only in two cases where better than average pipe life is obtained. No evident relationship appears to exist between service life and other operating conditions.

9. *Evaporator Effect Transfer—Concentrated Black Liquor.* Steel is usual material, with two mills reporting wrought iron. Average life is from 1 to 15 years, with wrought iron having shorter life than steel. Corrosion is reported at bends and joints, but mostly uniform.

Two mills report scaling. Longest life occurs at mill using lowest temperature (118 Fahr.) and lowest velocity (50 to 150 gpm). Other service conditions seem to have no direct bearing on service life.

10. *High Concentrator Circulation—Concentrated Black Liquor.* Both steel and wrought iron are reported in this service, with one mill using 18-8 stainless steel. Average life is 1 to 15 years with one mill reporting life of steel pipe only ¼ year.

Only one mill reports scale, with ultimate failure in joints, whereas other failures occur in pipe threads, bends, and at scattered points.

Mill reporting longest service life (15 years) for steel has lowest rate of flow and intermediate percentage sulphidity. Other factors seem to have no direct influence.

11. *Concentrated Black Liquor to Flash Pot—Black Liquor.* Steel is usual material reported with some users of wrought iron, and one reporting use of cast-iron pipe. Average service life is exceptionally short—cast iron only ½ year, wrought iron from 7 months to 7 years, and steel from 1 to 3 years. Failures are reported in bends, flanges and threads, and for the average, at scattered points.

No scaling reported. No direct relationship exists between service conditions and life, with the exception that cast iron is used at relatively low flow rate and temperature.

12. *Flash Pot to Disk Evaporator—Heavy Black Liquor.* Steel is most common material, with a few reports of wrought iron, and one mill using cast iron. Average service life is nearly 10 years, indicating relatively mild corrosion for most mills using steel and wrought. Cast-iron pipe gave relatively short service at the only mill reporting its use.

Failures occurred in two instances at threads, one at bends, and in others at scattered points. Longest life comes with lowest rate of flow and temperature under 200 Fahr. No scaling was reported.

13. *Disk Evaporator to Mixing Tank—Heavy Black Liquor.* Steel is common material, with only one mill reporting use of wrought iron. Average life is from 3 to 25 years, with failures not confined to any special location.

Longest service life may coincide with lower density and temperature, though all service conditions reported are in fairly good agreement.

14. *Recovery Furnace Spray Pump—Black Liquor and Salt Cake.* Steel is most common, with some users of wrought iron, and one reporting 18-8 stainless steel. Average life from 3 months to 25 years, with wrought iron slightly better than steel. Stainless steel installation is relatively new.

Failures occur at scattered areas. Longest life appears to come with lower densities and rates of flow, whereas shortest life may result with high sulphidity and relatively high temperature. Scaling appears to have no definite effect on service life.

15. *Weak Liquor Storage to Dissolving Tank—Weak White and Green Liquor.* Steel is usual material, with two mills reporting wrought iron and one CNi. Average life is from 6 months to 15 years, with steel better than wrought iron.

Failures occur at joints, bends, and in threads, and at any point. Shortest life coincided with scaling, high density, solids, and temperature. Low concentration liquors are not particularly corrosive.

16. *Dissolving Tank Circulating—Raw Green Liquor.* Steel is the common material reported with some mills using wrought iron, one cast iron, and one cement-lined steel. Steel has longest average life (1 to 10 years), wrought iron second best (3 months to 7 years), cement-lined steel 1 year, and cast iron six months—both last on basis of one installation case.

Failures occur at any point, and in bends, joints and threads. Cement-lined steel

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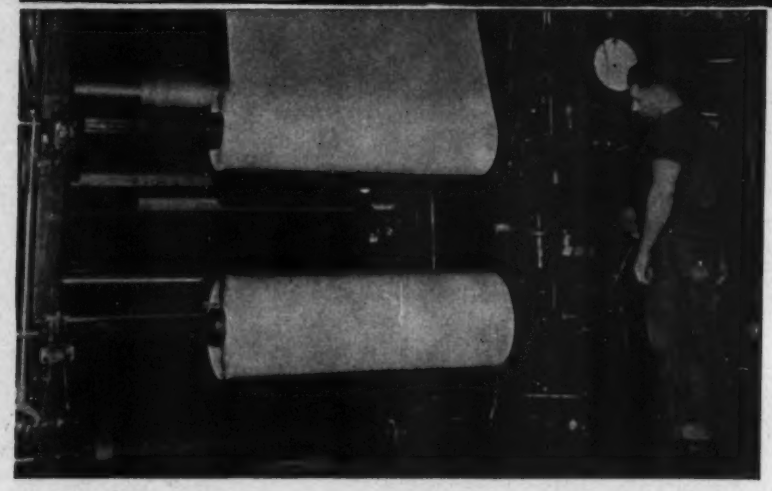

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failed near the discharge end. Scaling and other factors appear to have no direct influence on service life, although it might be inferred that low temperature, solids, density, and rate of flow give slightly longer life.

17. *Dissolving Tank to Green Liquor Storage—Raw Green Liquor.* Steel and wrought iron are most common materials reported, with one mill reporting cast iron, and one CNi. Steel has slightly better life than wrought iron, with CNi about twice better than cast iron. Service life of steel 1 to 10 years, for wrought iron 2 to 7 years, cast iron 2 years, and CNi 4 years to date.

Few failures occur in joints and threads, but most are reported at scattered points. Scaling occurs most with wrought iron, but seems to have no direct bearing on life. Lower temperature and density favor longer life.

18. *Dregs Washer to Weak Liquor Storage—Weak Green Liquor.* Steel is most common material, with one report of wrought iron and one of CNi. Steel has life from 3 to 10 years, wrought iron 6 to 7, and CNi over 4 to date.

One failure is reported in threads. No scaling is reported. Low sulphidity seems conducive to longest life, but other factors seem to have no direct bearing.

19. *Green Liquor Storage to Clarifier—Raw Green Liquor.* Steel is usual material, with two reporting wrought iron and one CNi. Steel gives best life (from 8 months to 10 years), wrought iron from 2 to 7 years, and CNi for the one user reporting over 4 years to date.

Failures occurred in one instance in threads, once in bends, and at scattered points for others. High rate of flow, relatively high density, sulphidity, and temperature appear to have contributed to short life of steel at one mill. High sulphidity and temperature seem to have greatest bearing on reduced service life in the average installation.

20. *Dregs from Clarifier to Dregs Washer—Sludge.* Steel is usual material, with two mills reporting wrought iron. Life reported for wrought iron is better than steel at 6 to 20 years, with steel 1 to 10 years.

Two failures occurred in bends and one in threads. Low rate of flow, sulphidity, and temperature are conducive to longest life. Scaling favors wrought iron, but apparently does not reduce corrosion on steel.

21. *Dregs from Washer to Waste—Sludge.* Steel is common material with only one mill reporting wrought iron. Steel has life from 1 to 15 years, and wrought iron (one case) from 10 to 12 years.

Failures occurred in one instance in threads, and once in the valve. Low sulphidity and temperature evidently favor longer life. Other factors could not be obtained for the report, sufficiently.

22. *Green Liquor Clarifier to Causticizer—Clarified Green Liquor.* Steel is the most common material reported, with lesser use of wrought iron, and one mill reporting CNi. Average life of steel 6 months to 15 years, wrought iron 2 to 3 years, and CNi in use over one year. Failures occur in joints, ells, and at any point.

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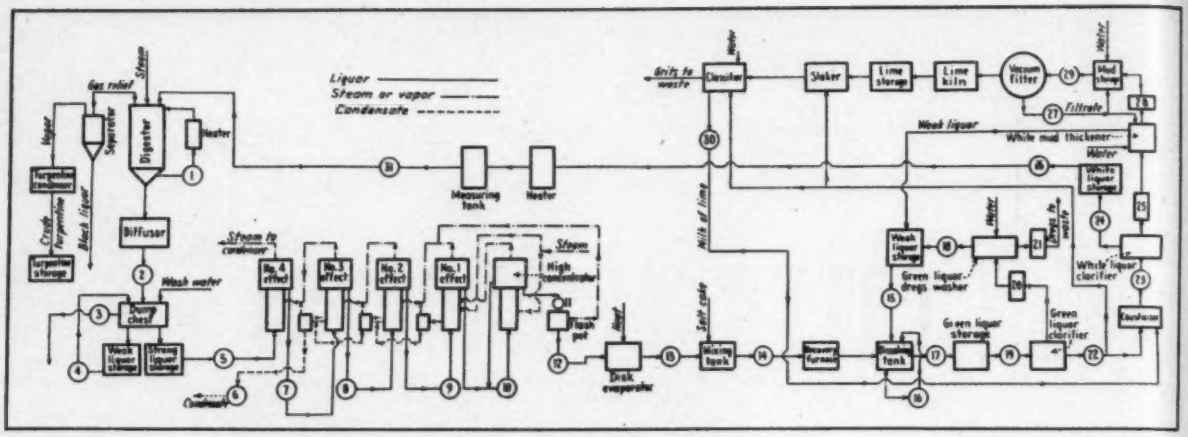
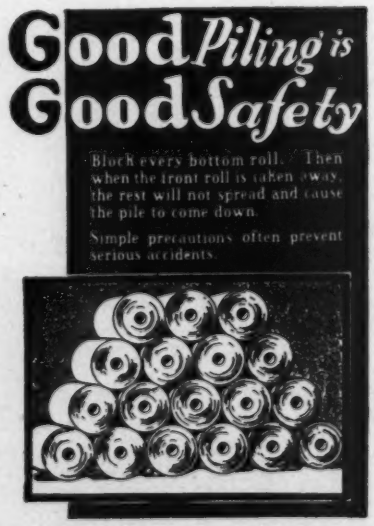


Fig. 1—Typical fluid flow in sulphate pulping process

Item	Service	Liquid
1	Digester Circulating	Sulphate Liquor
2	Diffuser to Dump Chest	Brown Stock
3	Washed Stock to Process	Brown Stock
4	Weak Spent Wash Liquor Storage to Dump Chest	Weak Black Liquor
5	Strong Spent Liquor Storage to Evaporator	Strong Black Liquor
6	Steam Condensate from Evaporators	Water Contaminated with Black Liquor
7	Evaporator Effect Transfer	Weak Black Liquor
8	Evaporator Effect Transfer	Intermediate Black Liquor
9	Evaporator Effect Transfer	Concentrated Black Liquor
10	High Concentrator Circulation	Concentrated Black Liquor
11	Concentrated Black Liquor to Flash Pot	Black Liquor
12	Flash Pot to Disk Evaporator	Heavy Black Liquor
13	Disk Evaporator to Mixing Tank	Heavy Black Liquor
14	Recovery Furnace Spray Pump	Black Liquor and Salt Cake
15	Weak Liquor Storage to Dissolving Tank	Weak White and Green Liquor
16	Dissolving Tank Circulating	Raw Green Liquor
17	Dissolving Tank to Green Liquor Storage	Raw Green Liquor
18	Dregs Washer to Weak Liquor Storage	Weak Green Liquor
19	Green Liquor Storage to Clarifier	Raw Green Liquor
20	Dregs from Clarifier to Dregs Washer	Sludge
21	Dregs from Washer to Waste	Sludge
22	Green Liquor Clarifier to Causticizer	Clarified Green Liquor
23	Causticizer to White Liquor	Raw White Liquor
24	White Liquor Clarifier to White Liquor Storage	Clarified White Liquor
25	White Liquor Clarifier to Thickener	Sludge
26	White Liquor Storage to Heater and Measuring Tank	White Liquor
27	Vacuum Filter Filtrate	Weak White Liquor
28	White Mud Thickener to Mud Storage	Sludge
29	Mud Storage to Filter or Waste	Sludge
30	Classifier to Causticizer	Milk of Lime
31	Measuring Tank to Digester	White Liquor

This Is One of Your Problems!


Good Piling is Good Safety
Block every bottom roll. Then when the front roll is taken away, the rest will not spread and cause the pile to come down.
Simple precautions often prevent serious accidents.

But you have many more.

Do you know what they are?

Do you know how you can *solve* them?

Do you realize that for the sake of our War efforts, you *have* to solve them?

For a complimentary copy of our Memo No. PP-O, "The Principal Accident Problems in the Paper Industry," just write on your Company letterhead to:—

Paper and Pulp Section

NATIONAL SAFETY COUNCIL, INC.

20 North Wacker Drive **Chicago, Illinois**

"Alltogether dis-fellow box belong kigh-kigh he dry-bone!"

Ask the Marines . . . they know what this means. It's Pidgin English* . . . Solomon Islands talk . . . and it means:

"All these boxes of food are tough!"

They have to be. It takes tough containers to supply a tough army. That's where the "plug" comes in. "Plug" is radio English for "commercial."

Tough, weatherproof corrugated boxes that are acceptable to the Government for specified shipments abroad are being made by the use of Stein-Hall adhesives in which resins are incorporated. So the Stein-Hall Starch Combining Process for manufacturing corrugated board is helping the fight for Victory.

Talk-talk belong me-fellow he-finish – meaning, as you thought . . . "Our story is ended."

*"Pidgin is not 'corrupt' English. Its grammar is simple, but its rules are as firmly fixed as those of the best English" -from MELANESIAN PIDGIN ENGLISH, published by Linguistic Society of America.

If you'd like an original suitable-for-framing print of Brussel-Smith's wood engraving (right) drop a line to Stein, Hall.

The Stein-Hall Process

STEIN, HALL & CO., INC.
285 Madison Ave., New York City

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2841 South Ashland Ave., Chicago

GK Means KNIFE-LIFE INSURANCE . . . .

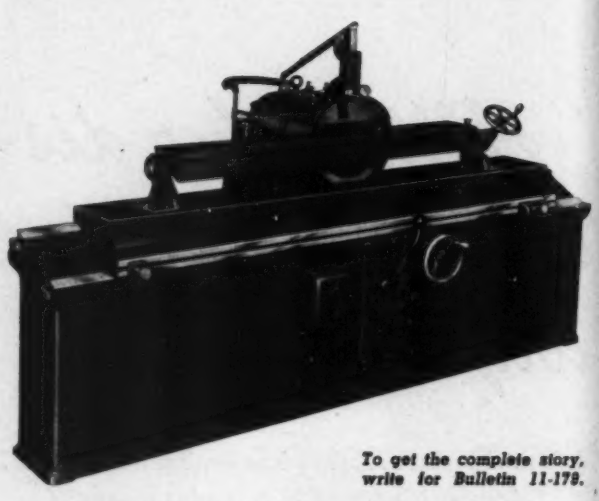
AS YOUR mill production mounts, so does machinery maintenance. Maintenance is a serious subject in these strenuous times when replacement is difficult.

In the paper industry, there is the important item of KNIFE CONDITIONING. Now, more than ever before, the Covel-Hanchett GK Knife Grinder is proving its worth. With a half-century of Covel-Hanchett's experience behind it, the new GK has won a reputation for efficient, precise and economical work.

The GK is s-m-o-o-t-h — vibration and chatter are "out" — even with the strongest grinding pressure because of the solid, compact, extra heavy exclusive Covel-Hanchett construction features for supporting the carriage, knife bar and grinding wheel.

Knives can be ground to closer tolerances, for heavier cuts and increased production; while the tendency towards over-heating the work is reduced.

GK Knife Grinders are available in 14 sizes, from 26" to 120" capacity. Act now to make your knives cut faster — cleaner — over a longer "knife lifetime."



To get the complete story, write for Bulletin 11-178.

★ SAW SHARPENERS
★ SAW STRETCHERS
★ KNIFE GRINDERS
★ SWAGES AND SHAPERS
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COVEL-HANCHETT CO.
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In the few instances where scaling was reported pipe life was shorter than the average. Low temperature, density and sulphidity favor longer pipe life.

23. *Causticizer to White Liquor—Raw White Liquor.* Steel is the usual material reported for this service, with two mills reporting wrought iron, one CNi, one cast iron, one cement-lined steel, one 5 per cent nickel steel, and one rubber. Reports were not available on average life for cement-lined steel or rubber since both are relatively new installations. Average life of steel is reported from 3 months to 10 years, for wrought iron from 6 months to 1 year, 5 per cent nickel steel 1½ years, CNi and cast iron 2 years. This service is a relatively corrosive one.

Failures occur at joints, threads, flanges, seams, angle welds, and at scattered points. Scaling is present in a few instances and appears to shorten service life. Other factors have no definite effect.

24. *White Liquor Clarifier to White Liquor Storage—Clarified White Liquor.* Steel is the most common material in this service, though use of wrought iron, CNi, rubber, and 5 per cent nickel steel are reported. Average life of steel is from ½ to 10 years, for wrought iron from 1 to 15 years, for CNi from 1 to over 7 years to date, for 5 per cent nickel steel 1½ years to date, and no reported service life for the one rubber installation. Failures are reported in threads, ells, flanges, joints, and at scattered points.

Where scaling is reported for wrought iron its service life is greatest, and for one case with steel scaling was associated with longer life. Lower temperature (under 200 Fahr.) appear to have more effect than other factors in increasing service life.

25. *White Liquor Clarifier to Thickener—Sludge.* Steel is the most commonly used material, with one mill reporting wrought iron and one 5 per cent nickel steel. Average life reported for steel was from 1 to 10 years, for wrought iron (one case) 10 years, and for 5 per cent nickel steel 1½ years to date. Failures occur at flanges, bends, threads, and at scattered points.

With the few instances where scaling is reported service life is slightly better than average. Low temperature favors longer life, whereas the effects of other factors are not so clearly defined.

26. *White Liquor Storage to Heater and Measuring Tank—White Liquor.* Steel is the most common material, with several reports on use of wrought iron and two on CNi. The average life of steel is from 2 to 10 years, of wrought iron 5 to 15 years, and CNi from over 4 to 7 years. Failures occur in ells, joints, and at miscellaneous points.

Scaling of wrought iron appears to favor longer life, whereas its effect with steel is not so clearly defined. Low temperature and sulphidity favor longer life. The effects of high solids and density do not appear to have important bearing on service life.

27. *Vacuum Filter Filtrate—Weak White Liquor.* Steel is usual material for this service, with some reports of wrought iron and one of CNi. The average life of steel is from 3 to 14 years, of wrought iron 12 to 20 years, and for CNi a report of 4 years to date. Failures of steel are reported at joints and ells, with the usual failures presumably by uniform corrosion.

Scaling favors longer life for wrought iron, but gives intermediate life in the one case reported for steel. Low temperatures and density favor longest life, but the effects of sulphidity could not be clearly defined.

28. *White Mud Thickener to Mud Storage—Sludge.* Steel is the most common material reported with several reports on the use of wrought iron. Average life of steel is reported as 3 to 15 years and for wrought iron 4 to 20 years. Failures occur in ells, joints and at any point.

Scaling is reported on steel in two instances, in both of which service life was less than average. Longest life of steel is reported with higher than average rate of flow, low density and higher than average temperature. Longest life for wrought iron coincides with intermediate temperature, but with other factors not fully reported.

29. *Mud Storage to Filter or Waste—Sludge.* Steel is the common material, with some use of wrought iron, and one mill reporting CNi. Average life of steel is from 1½ to 15 years, for wrought iron 2 to 20 years, and in the one instance reporting CNi the life is 4 years to date. Failures occur in ells, joints, flanges, and at any point.

Scaling of steel seems to coincide with shorter life. It is not reported for wrought iron or CNi. Low density and temperature favor longest service life.

30. *Classifier to Causticizer—Milk of*

. . . A Good Name in All Cotton Dryer Felts

LONG experience with RICHLAND Triplex has given many paper men a knowledge of what to expect from these heavy duty all cotton dryer felts. They know that the highly uniform yarns from which they are woven make them wear longer. They have learned that these sturdy felts have a high degree of porosity . . . that steam consumption with them is low . . . that their shrinkage and stretch has been reduced to a minimum. It is the confidence that these men have in RICHLAND Triplex that causes them to specify these all cotton dryer felts time and again. And it is this same confidence that helps to inspire the care with which RICHLAND Triplex dryer felts are made.

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INGENUITY + COURAGE + WORK = MIRACLES

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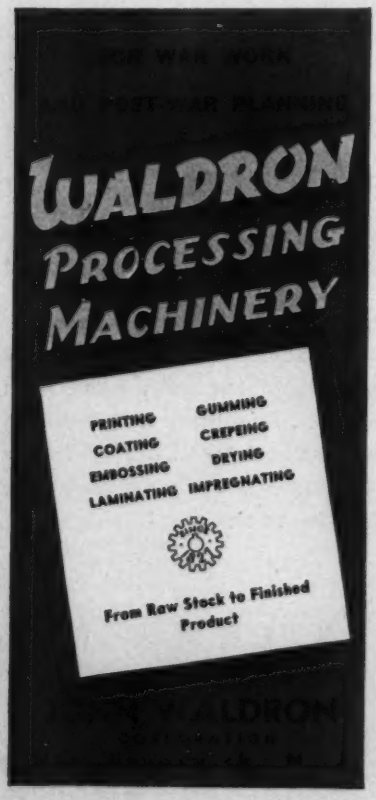
KALAMAZOO VEGETABLE PARCHMENT CO.

Parchment — Kalamazoo — Michigan



Lime. Steel is the usual material for this service, with one report on the use of rubber pipe. Average life of steel is from 1 to 10 years, and for rubber (in the one case reported) 1 year. Failures occur in ells, and at scattered points, presumably from thinning by uniform corrosion.

Scaling of steel is reported in only one instance, with the installation reporting longest service life. Low sulphidity appears to favor longest life, with the effect of other factors not clearly defined.

31. *Measuring Tank to Digester—White Liquor.* Steel is the usual material reported, with some use of wrought iron in this service. Average life of steel is from 1 to 10 years, and of wrought iron from 1½ to 3 years. Failures are reported at joints in one instance, and presumably by uniform corrosion in others.

Scaling is reported in only one instance. Low temperature appears to favor longer life. Low rates of flow likewise appear to favor longer life for steel, though this factor is not fully reported for all installations. Other factors have effects less apparent from the data reported.

Efficient Reuse of Process Water

H. A. MORRISON

Oliver United Filters, Inc.

The objective in most mills as operated a few years ago, was to minimize loss of fiber when large volumes of water were discarded from each department. It is now known that efficient removal of fiber will commonly permit direct reuse of the water in the same or in preceding steps of manufacturing, with consequent reduction of outside water demand.

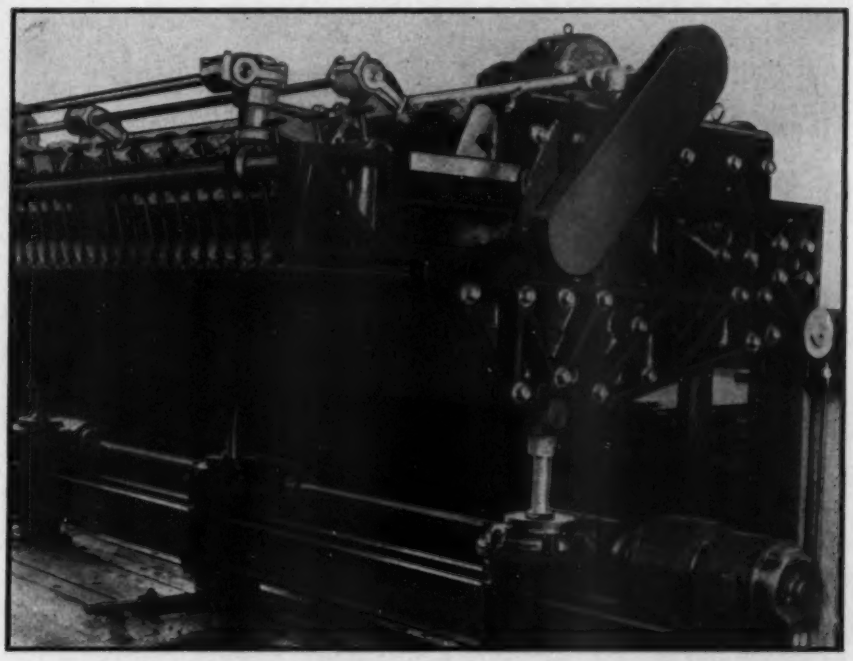
Many states impose heavy penalties against pollution of streams and waterways. Public health and other elements of conservation represent a force which industry cannot and should not oppose. It is fortunate that pulp and paper mills usually make money directly from correction of their disposal methods to harmonize with informed intelligent public opinion.

Contrary to popular opinion, it is sometimes unfortunate for a plant to have an unlimited supply of fresh water. Best efficiency in water usage, with no particular cost burden, is often found where water supply is limited.

The actual cost per million gallons of process water, including filtration and chemical treatment for the 81 mills listed in TAPPI Special Report 298 ranges from $0.55 up to more than $30.00, and the general average is $11.00. Kraft paper mills on wrapping, bag and liner grades, when using the average 36,100 gallons water per ton of product, with process water costing $3.00 per million gallons, expend 10.8 cents for water to make each ton of product. Accordingly, a 500 ton mill spends annually more than $17,000 for paper mill water. Consider the size of this item when water costs run up to over $30.00 per million gallons.

In fine paper mills reduced use of outside water contributes to cleaner paper. Average process water at its best will

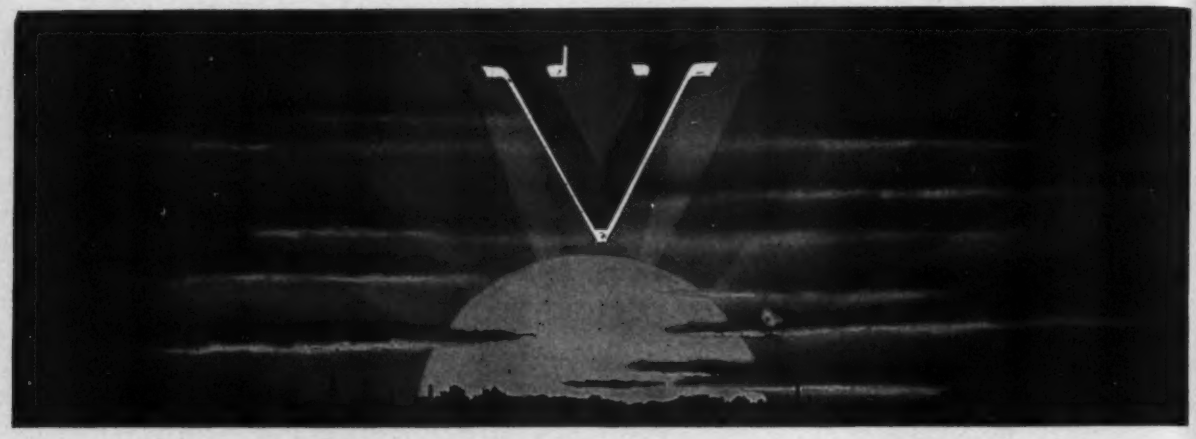
NOT A *MILITARY* SECRET



The speed at which this Valley Inlet is making paper is not a *military* secret. But it is a secret of the operating mill. We can only say that it is making paper faster than paper has ever been made before. The fastest running paper machines in this country or abroad have "Inlets by Valley."

VALLEY IRON WORKS CO.
APPLETON, WISCONSIN

Slices and Head Boxes • Screw Presses • Micro-Mist Spray Dampeners • Laboratory Equipment
Pulp Washing Systems • High-Speed Beaters • Breaker Beaters • Vortex Beaters • Plug Valves
Sutherland Refiners • Flat and Rotary Screens • Thickeners • Deckers • Paper Markers • Roll-Headers



WITH THE DAWN WILL COME MILL PROBLEMS AND CHANGES

Included in post-war replacement and improvement programs will be plans to strengthen stock preparation procedures. That will involve new pulping and refining equipment which suggests early mill planning.

Bauer engineers are, therefore, at your service. They stand ready to demonstrate the advantages Bauer pulpers may hold for you, the benefits many mills are already obtaining through their use. Bauer experimental pulp laboratory available to all mills for stock study.

Maintenance parts and supplies shipped promptly. New equipment available when essential to War program.

The BAUER BROS. Co., Springfield, Ohio

bring in both dirt and undesired materials in solution. Sand filter efficiency increases as rate of flow is reduced. By using less water we produce a sheet of lower dirt count as the incoming water is purer.

General experience in pulp and paper mills leads to the conclusion that it is necessary to waste a limited portion of mill circuit water to prevent accumulation of dissolved substances. Spilling from the system will not obviate the proven need for chlorine, chloramine, or other treatment, to limit and control slime growth. For best average results, it is deemed generally desirable to (1) introduce comparatively little outside water; (2) minimize slime formation by chemical treatment; (3) practice good housekeeping to periodically remove slime and dirt, and (4) discard continuously enough clarified white water to balance the net addition of outside fresh water.

In a mill where old book papers are defibered by cooking in soda ash solution in a batch heater for use in coated board, the effluent hot water from a vacuum filter is reused in the beaters. The filter takes feed at 1.66 per cent consistency and 175 Fahr., discharges pulp at 22 per cent and returns 600 gpm filtrate when handling 65 tons of old papers per day.

Reuse of the hot filtrate cuts soda ash demand 50 per cent, sharply reduces steam consumption, and lowers both filter and fiber losses, as compared to the open system formerly employed.

Bleach washing of deinked book stock on vacuum filters is an example of efficient use of wash water coupled with high recovery of fiber and filler. The water-effluent from the filter can all be reused in the deinking and screening steps.

Many container board mills have installed vacuum filters following rifflers or hydrapulpers. Board machine white water returns to the filter feed and the mixture comprises all of the filler stock plus all of the excess mill white water. Feed consistency may be as low as 0.50 per cent but commonly averages 0.81-1.0 per cent.

In a 100 ton mill the filter feed is about 2,100 gpm. Stock to machine chest at 4 per cent amounts to 420 gpm. Filtrate is automatically separated into a "cloudy" fraction of 420 gpm at .02 per cent and a "clear" portion of 1,260 gpm at .004 to .006 per cent consistency.

Temperature drop across the filter does not exceed 2 Fahr. provided filtrate is used throughout the mill excepting when running white liner grades. On liner cylinder showers on patent coated board, fresh water is advised.

Cloudy filtrate is used to dilute stock at breaker beater or pulper after being heated to desired temperature, about 175 Fahr.

Clear filtrate is pumped to felt showers, inside cylinder showers and to screens, jordans and consistency regulators. A portion of this clear filtrate, amounting to less than 500 gpm in a 100 ton container board mill, is sent to sewer. There need be no other water outlet. Chlorine is used for slime prevention, the rate being 0.5 lb. per ton of board in a typical plant.

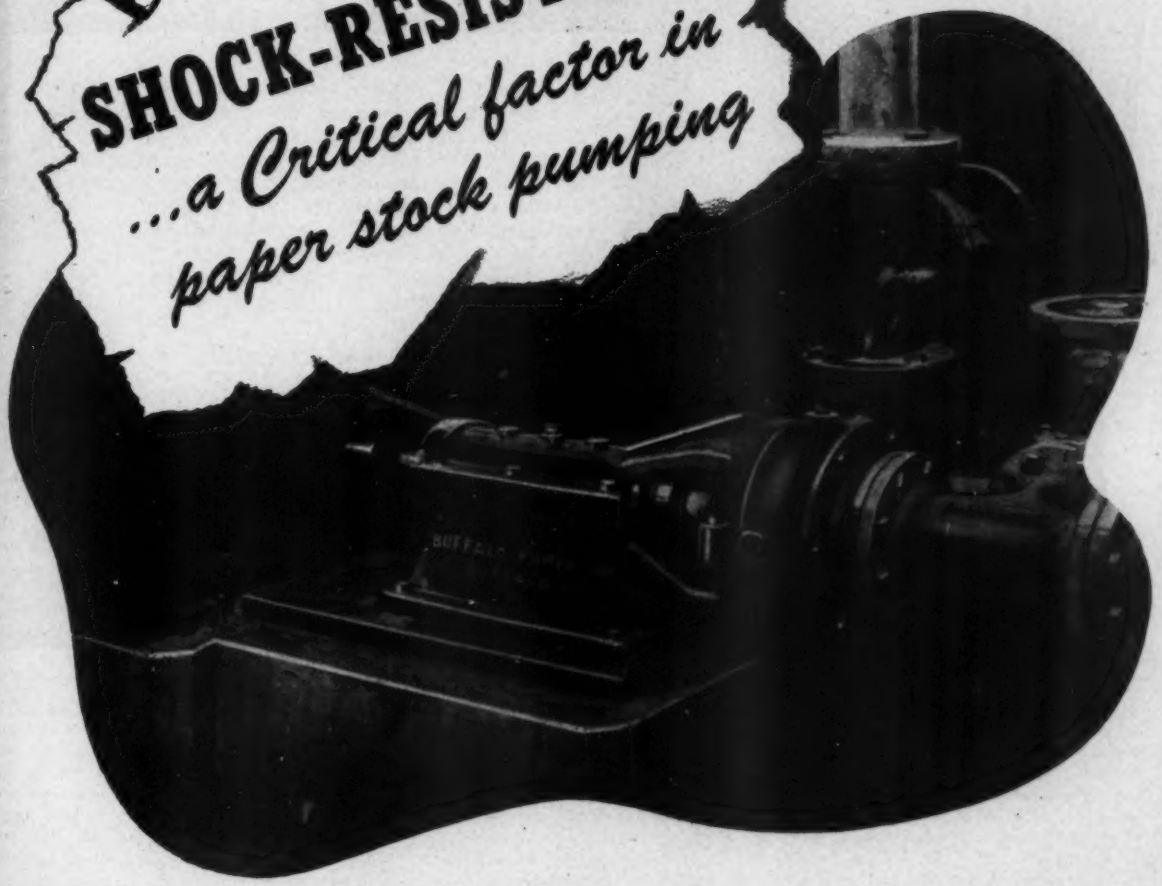
Highly efficient reuse of process water is practiced in a 400 ton Canadian newsprint mill, where the paper mill and groundwood departments operate with a common white water system. This efficient mill wastes only 500 gpm and shrinkage is less than 1 per cent on paper production. This does not include water sewered by the sulphite pulp mill.

All groundwood deckers in the above mill are vacuum filters, arranged to split the filtrate into two fractions. The "cloudy" portion, amounting to about 25 per cent of the total and at .035 per cent consistency is used for thinning pulp prior to screening. Return white water from the paper machines is likewise introduced at the groundwood screen head boxes.

The "clear" filtrate fraction provides shower water for groundwood fine screens and for all shower purposes on the paper machines, excepting that fresh water is used in the Bird screen showers. The only flow to sewer is the overflow of the excess clear filtrate tank. This small stream averages about .016 per cent b.d. consistency, the solids being about 25 per cent clay.

Decker feed at the above mill is at 118-120 Fahr., filtrate averages around 112-116 Fahr. and mixed stock to machine wires runs about 100 Fahr. Stock at 2 per cent consistency in the grinder canals is above 150 Fahr. Slime growth is negligible in the combined groundwood and paper machine circuit as the high temperatures serve to sterilize the circulating water. Slime producing organisms which

SHOCK-RESISTANCE ...a Critical factor in paper stock pumping



TODAY—of all times—paper stock pumps must keep on the job! Breakdowns, with the necessary repairs and replacements, can result in long delays and lost production . . . Buffalo Full Ball-Bearing Paper Stock Pumps are meeting today's abnormal conditions with superior performance. Their husky, *shock-resisting* construction, with non-clogging impellers, is taking the abuse of stepped-up production—delivering paper stock on schedule—keeping "war paper" on the move. Yes, and they'll be on the job daily, performing with top efficiency, long after the Peace is won!

BUFFALO PUMPS INC.

213 Mortimer St. Buffalo, N. Y.

Branch Engineering Offices in Principal Cities

CANADA PUMPS, LTD., KITCHENER, ONT.

"Buffalo" **PAPER STOCK PUMPS**

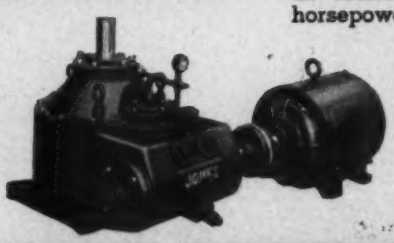
For driving agitators, mixers and similar equipment—

JONES WORM-HELICAL SPEED REDUCERS

HERE is a line of machines that fills a long felt need for double reduction units of the fully enclosed type to be used for agitators, mixers, etc. requiring a vertical shaft drive.

Many of these Jones units have established excellent performance records in a wide variety of service. As a result of that experience a complete standard line has been developed covering 15 standard ratios ranging from 40 to 1 to 250 to 1 for all common motor speeds and a wide range of horsepower ratings.

• This Jones Worm-Helical Speed Reducer on a lacquer agitator is typical of the wide range of services for which these drives can be used such as ore roasters, pulp tank mixers, furnaces, bending rolls and similar applications.



The new Jones Bulletin No. 75 covers complete details on these new Worm-Helical Speed Reducers, with rating tables, dimension diagrams, torque charts and other application information. We shall be pleased to send you a copy.

W. A. JONES FOUNDRY & MACHINE CO.
4439 Roosevelt Road, Chicago, Illinois

Jones

HERRINGBONE—WORM—SPUR—GEAR SPEED REDUCERS • PULLEYS
CUT AND MOLDED TOOTH GEARS • V-BELT SHEAVES • ANTI-FRICTION
PILLOW BLOCKS • FRICTION CLUTCHES • TRANSMISSION APPLIANCES

come in with the wood are killed by the heat at the grinders. All large pipe lines handling stock of white water are of "Transite." Fresh water, introduced at Bird screens, practically balances the volume of clear filtrate to sewer.

The above system provides fairly constant temperatures at the machine head box. The paper machines operate smoothly, with below 14 per cent sulphite in the furnish at speeds above 1,200 fpm. The sheet carries about 2 per cent ash, and its printing qualities are good.

Water leaving the paper mill always carries away valuable fiber and heat units. Frequently color, alum, and fillers are lost. To minimize white water losses of all kinds including water, save-alls of various types are employed. They should be able to efficiently handle the entire excess white water flow from the individual machine which they serve and to deliver the recovered materials into the machine chest at desired consistency, 2-3 per cent, uncontaminated by dirt, at a rate closely in step with machine production. Water from the save-all, to be suitable for general reuse, must be sufficiently clarified so it can be utilized at the showers and elsewhere on the machine, instead of outside water.

On one Fourdrinier machine making 32.5 tons of hanging paper per day, actual flow to sewer averages 50 gpm. The vacuum filter save-all on this machine handles 600-700 gpm, of which more than 90 per cent is directly recycled on the same machine. Filtrate averages 0.011 per cent consistency on a variety of hanging and news grades.

Water requirement is minimized in washing kraft or soda pulp for removal of black liquor when counter current methods are employed.

No water comes into the system except as wash on the final stage of vacuum washers. Decker filtrate is pumped back for thinning at screen head boxes and a portion may be heated for displacement of weak black liquor on the final vacuum washer. The remainder to waste need not exceed 1,000 gallons per ton of pulp in the average mill, or 1,500 gallons on kraft pulp cooked for bleaching where a rewasher may precede the flat screens.

Without reuse of white water, within practical limits, a multi-stage bleach plant requires a veritable river of high purity process water. Many mills recycle most of the washer filtrate after hypochlorite bleaching, but reuse after the washers on chlorinated or on caustic treated stock is unusual though deserving of more study.

In a six stage kraft bleaching plant of 100 tons daily capacity, each washer must have about 200 gpm high purity fresh water strictly for displacement washing on the sheet, the total thus being 1,200 gpm, equivalent to about 17,140 gallons per ton bleached.

Each washer produces about 1,700 net gpm filtrate. In order to maintain water balance, at least 1,200 gpm must be sewered, when in and out stock consistency for bleach plant are in balance. Additional outflow to waste is essential to eliminate foam and to maintain a stable concentration of bleach residues inside the plant and to insure high purity on finished stock. Water demand in practice is a matter of individual experience and preference. Under good average conditions in a 100 ton six stage kraft bleaching plant the water to sewer can be kept as low as 2,000 gpm equivalent to 28,600 gallons per ton pulp. With no reuse of bleach plant water, four times as much are required.

Assuming that stock is at 6 per cent consistency in each treatment step and that feed to each washer is at 1 per cent, amounting to 1,680 gpm, then 1,400 gpm liquid must be introduced ahead of each washer for dilution of feed.

Recirculation of washer filtrate for thinning the feed of the same washer is permissible practice on the hypochlorite bleach filters and probably can be done on the chlorinated acid stock and after caustic treatment. When dissolved substances are at low concentration, as in washer filtrates and provided there is no reprecipitation or adverse color effect, their recirculation for dilution of feed on the same washer does not necessarily increase their inclusion in washed stock.

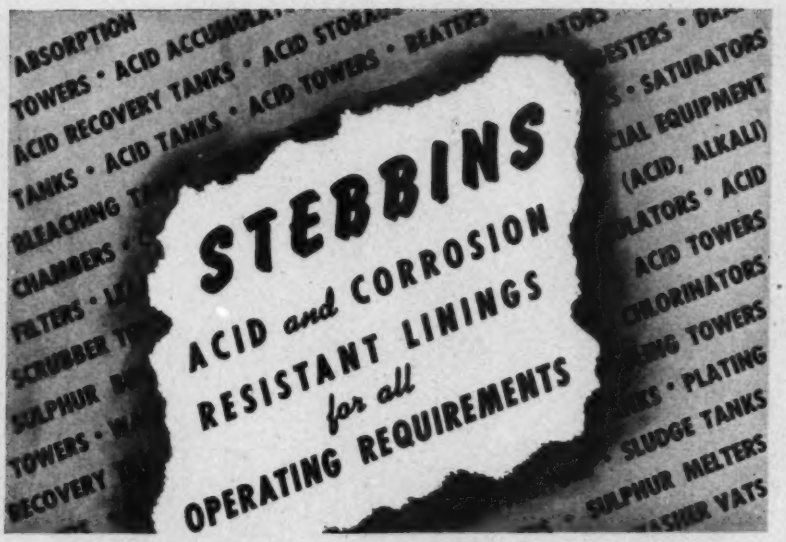
On vacuum washers, the water soluble impurities are removed by using clean fresh water to displace the liquid in which they are dissolved. By applying 200 gpm to a pulp sheet which is at 10 per cent consistency (1.08 gallons per pound pulp) and finally bringing cake back to 10 per cent as it leaves the washer, we are using 30 gpm in excess of the theoretical quantity to completely displace the liquid in the sheet. For best economy on wash water, agitation

A WORLD APART?

Peace and quiet reign in the realm of these timber giants of our Pacific Northwest. This would seem to be "a world apart" . . . . a place far removed from the responsibilities and the privileges of active participation in war. • Yet, in harvesting our timber we are finding as a nation that our forest land is a tremendous victory garden—that timber is a crop. • Its fruits include staples like rough and finished lumber . . . like a hundred kinds of paper to promote and sustain the vitality of enterprises military and civilian. And the forest yields an endless variety of essential products like fabrics, special packages, plastics . . . . even gunpowder. • It is fortunate for this country and its allies that vast forests like those of the Pacific Northwest are yielding an abundant and continuous supply of things needed at home and abroad by men at war.

Pulp Division
Weyerhaeuser Timber Company

BLEACHED AND UNBLEACHED SULPHITE PULP
Mills at Longview, Washington • Everett, Washington



STEBBINS experience over a period of 59 years in the Pulp and Paper Industry has covered almost every kind of lining problem. The wide variety of equipment designed by STEBBINS during this period for successfully handling acid, alkali and corrosive liquids, gases and vapors ranges from Acid Accumulators to Washer Vats and from Pickling Tanks to Acid Towers. Consult us today on your lining and tank problems.

SEMCO

Stebbins Engineering and Manufacturing Company

EASTERN BLVD. WATERTOWN, NEW YORK

● *We offer safe, economical solutions to all pulp and paper mill drainage problems with our twill weave, plain weave, sewed seam, and soldered seam wires.*

INTERNATIONAL WIRE WORKS

MENASHA, WISCONSIN

of the feed after thinning and before washing is desirable. This puts the water soluble materials quite completely into solution so they can be removed by direct displacement.

Counter current washing for recovery of caustic at highest concentration is employed in all alkaline pulp mill causticizing systems. Most of the larger mills, 200 tons or more pulp per day, reburn the filtered washed mud to CaO for reuse. Many plants, especially of small to medium capacity, sluice the washed mud to storage or waste with outside water.

In the kraft process, each ton of pulp produced requires the handling of about 900 lb. insoluble solids, mainly $CaCO_3$, as delivered to the final vacuum filter. Accordingly a 200 ton mill reburns or wastes around 90 tons dry basis mud per day. In such a mill, 25-30 gpm wash water at 120-135 Fahr. is used on the mud filter. For sluicing away the same tonnage of solids at 20 per cent insolubles, 45 gpm additional water are needed.

Sluicing mud away costs the mill 45 gpm water and 750-1,000 lb. soda (as Na_2O) every operating day.

When the lime mud is to go to a kiln for reburning, filter feed may be 35 per cent insoluble solids in white liquor at around 2 per cent total soda (as Na_2O). Cake may average 46 per cent moisture and 0.50 per cent total soda (as Na_2O) basis dry solids in cake. Actual soda loss in causticizing in a modern system equipped with kiln for reburning seldom exceeds 5 lb. (as Na_2O) per ton of pulp manufactured.

Filtrate from the mud filter goes back to the dissolving tank in the kraft mill. In the soda process, filtrate is normally sent to the black ash leaching cells.

Many classes of equipment can be and are used in addition to or instead of vacuum filters to condition water for reuse. Slush thickeners, gravity deckers, several different types of pulp washers and thickeners, gravity settling tanks, to mention a few only, all have to be considered when planning a modern water conservation system.

Tall Oil for the War Effort

J. M. WAFER[1], A. POLLAK[2], and R. HASTINGS[3]

For those who are not familiar with tall oil it might be explained that in the soda and sulphate processes for pulping pine wood, the fatty and rosin acids in the sap dissolve in the cooking liquor as the sodium soaps. When the resulting black liquor is evaporated, prior to burning, these soaps salt out much as does ordinary soap in a soap kettle. This soap can be separated from the black liquor and the separated pasty, sometimes frothy, mass constitutes the commodity known as *crude tall oil skimmings*. This material has found only a very limited use because of its high bulk and its high content of water which make it costly to ship for long distances. The presence of appreciable amounts of impurities, especially occluded black liquor, further increase shipping costs. When these skimmings are acidulated, a dark brown oil can be separated in approximately 50 per cent yield and this is known as *crude tall oil*. Being relatively free of water and impurities, and of less bulk, a much wider utilization has developed. Crude tall oil can be refined by various processes to yield material of improved qualities and other tall oil products, as will be reviewed later in this paper.

The term *tall oil* has become generally accepted in this country, being now used in the patent art, the periodical literature, freight classifications, and elsewhere, but in older references tall oil is designated as "liquid rosin." Tall oil is sometimes confused with rosin oil and with pine oil, but bears no similarity to these.

A considerable literature has developed on the chemistry and applications of tall oil. Over 500 references in the patent and periodical literature have been noted and several more or less complete bibliographies have been prepared (T. Jakobson, *Svensk Paperstidn.* 42:573, 574, 513, 514, 534, 535, 600: 1939; C. J. West, "A Bibliography on Tall Oil"—The Institute of Paper Chemistry, 1942; L. E. Wise, PAPER IND. AND PAPER W. 24, No. 8: 822-6, 831: 1942).

Despite this apparent wealth of information on tall oil, curiously enough, we lack most of the vital facts that would enable us to formulate a wise plan for its reclamation.

We have estimated that 100,000 tons of tall oil is available annually. In the absence of better information this estimate was made by guessing that the industry

(1) Industrial Chemical Sales Division; (2) director, Development Department; (3) Development Department, West Virginia Pulp & Paper Co.

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would collect, on the average, 120 pounds of skimmings per ton of 90 per cent moisture-free pine wood pulp and that of the 4.4 million tons of sulphate pulp produced in 1941, about 80 per cent of this production would be in a position to collect tall oil skimmings.

Another estimate could be based on the average daily pulp producing capacity of the various soda and sulphate mills and this would indicate, assuming a yield of 60 pounds of tall oil per ton of pulp, that 710,000 pounds of tall oil daily was recoverable in 1942.

Our guess of an average yield of 60 pounds of tall oil per ton of pine pulp was based on our experience, but this has not been a fair sample of the industry. We find the yield to be governed by so many circumstances that each mill must really be considered separately. Among the important factors we have found to affect the yield are: (1) the amount of non-pine chips cooked together with pine chips; (2) the amount of non-pine black liquor mixed with pine black liquor prior to evaporation; (3) the degree of seasoning of the pine wood used; (4) the season of the year; and (5) the kind of pine used. In addition to these factors which are difficult to alter, needless to say, suitable equipment must be properly installed and properly operated before good yields are consistently recorded.

Clearly, a plan can hardly be outlined until interested mills begin accumulating test data that will supply the answer to the question of how much skimmings and so, tall oil, could be made available. This is easy to do. Those mills already separating the skimmings need merely accumulate them in a borrowed tank for a sufficient time to ensure a reasonable precision for their weighings and subsequent calculations. Mills not yet separating skimmings can prepare reasonably good estimates by sampling black liquor at an evaporator effect where the solid contents of the black liquor is 25 to 30 per cent. By drawing samples of one barrel each and allowing them to stand any available skimmings will float to the top. The floating skimmings are best removed by means of an ordinary soup strainer or, if the chemist must, by some more expensive equivalent. A simple computation, based on the weight of the collected skimmings drained free of black liquor, the solids in the black liquor sampled, and the liquor solids per ton of pulp, affords a fair estimate of the skimmings yield. In good practice the tall oil yield is half the skimmings yield.

A number of devices have been proposed for separating crude tall oil skimmings from black liquor but a simple settling tank is adequate. Any settling tank where black liquor can be skimmed is satisfactory.

Many processes for refining tall oil have been proposed but very few have grown to commercial size. The economic problems confronting a tall oil refinery are not generally appreciated and are more serious than the technical problems. Crude tall oil is not easy to market. It has very few unique properties, so far as we know today, except its low price. It is, regrettably, the cheapest organic acid in the world. Until some commercially important special

uses are found, crude tall oil must be able to endure the competition of the many other fats, oils, fatty acids, and rosin to which consumers can turn. Refined tall oil must similarly compete with refined fats and fatty acids and, here too, it seldom finds any technical advantage and has so far always sold below them.

Most of the refined tall oil that has been made here and abroad is refined by vacuum distillation. Because of high corrosion rates the equipment used is expensive. Operating costs are high.

The more highly tall oil is refined, the lower its yield and the greater the quantity and number of by-products to be disposed of.

Some refined tall oil has been and is being made by processes other than vacuum distillation. There are probably also other processes, not yet tried commercially, that may be technically sound but lack the personnel and capital to develop them.

The current uses for tall oil have been generally advertised ("Liqro and Indusoil Tall Oil from Pinewood," New York, W. Va. Pulp and Paper Co. 1942). Its principal uses are in the manufacture of industrial soap products such as cleaning compounds, of oil, asphalt, and disinfectant emulsions, of lubricants, of flotation reagents of paints, and of many other products.

As an indication of its more essential uses, it is noteworthy that in England a recent regulation restricts the use of tall oil to the following four kinds of products: (1) jointing compounds for airdrome runways; (2) soluble cutting oils including emulsifiers used in the preparation of soluble cutting oils; (3) winter washes; (4) disinfectants.

Any effort, however urgent the need, to conserve tall oil will encounter two principal production problems. All skimmings must be conserved and skimmings must be converted to crude tall oil. Next are problems of utilization, and the question of refining tall oil is really one of these.

It should not require more than several months from the word "Go" to eliminate the waste of crude tall oil skimmings. Many potential sources of skimmings are already separating some because this improves evaporator efficiency. Having organized no outlet for this material it is being burned for fuel or wasted. Such mills need only to improve their present equipment. Mills having no separating equipment could readily put together a tank from surplus or from second hand equipment. Very little, if any, critical materials need be involved.

The conversion of skimmings to crude tall oil presents a somewhat greater problem in that it requires appreciable capital, critical materials, and technical personnel. Since there is already in almost all cases a nearby producer of crude tall oil, it would appear reasonable for the duration of the War to have the existing tall oil producers convert the skimmings available from all nearby sources. Where such a producer is operating only 8 hours, he could operate 24 hours, and even if he is already operating at full capacity, only a relatively minor quantity of critical materials and labor would enable him to enlarge his capacity to meet the needs in his area.

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One great advantage in bringing crude tall oil to the market by moving skimmings through regional converting plants would be that the considerable variations in composition among mills could be minimized by blending. Unless this is done all the tall oil will not be salable simply because, war or no war, it will not all meet the specifications which buyers will insist on.

The problems of utilizing the additional production of tall oil depend, in our opinion, on just how scarce fats and oil will actually become and also on the progress of the considerable amount of research and development work now directed to the increased utilization of crude tall oil. It is too early for us to offer a definite opinion on the real need for more tall oil refinery capacity.

The Relation of Ink to Stock

HERBERT JAY WOLFE

V.P. in charge Research, Kienle & Co.

A knowledge of the relationships between printing ink and paper is of the utmost importance to inkmaker, papermaker and printer, alike, if consistently good printing results are desired. The finest ink it is possible to make and the best grade of paper stock on the market may be run together with very poor results if the two are not designed for each other.

In any printing ink, the adhesion of the ink for the rollers, plates and paper must be greater than the cohesional forces present in the ink, otherwise it will not distribute properly and will pile or cake on the rollers or plates of the press.

The physical properties of an ink which influence its printing characteristics most greatly are its viscosity and its yield value. Thixotropy is also a factor. Viscosity is the measure of the internal friction of an ink caused by the rubbing of one particle over another and is measured by the resistance offered by the ink to flow after a certain definite force has been applied. In common terms it might be called the fluidity of the ink. Yield value is the force which must be applied to just cause an ink to flow. It is a sort of permanent "Butteriness." In thin inks the force of gravity is greater than the yield value and such inks will therefore level out or flow without the application of any additional force. This does not mean, however, that these inks have no yield value. Thixotropy, on the other hand, may be thought of as a sort of "false body" which upon agitation of the ink is temporarily destroyed, but which reforms again when the agitation is discontinued. In other words, it is a reversible gel, believed to be caused by the electrical charges present on the pigment particles.

Yield value and thixotropy, considered together, may be thought of as a brake on the fluidity of the ink. If one tries to print on a hard-surfaced, non-absorbent paper stock with a straight heat-bodied oil containing just sufficient color to render the printing visible, in general, the printing results will be very uneven and badly mottled. There is a double reason for

this: first, the fluidity of the ink causes it to form relatively long necks during the printing operation, and the "necks" on dropping back on the printing result in uneven film thickness; the second reason is that the ink will not stay put when it contacts the paper, but will tend to flow into the hollows of the paper surface, or into the more highly ink-receptive areas of the surface. If, on the other hand, this type of varnish ink is used on a highly absorbent stock, such as newsprint, the printing results will be quite good. Uneven, or non-homogeneous coating on the paper will also cause mottling for obvious reasons.

Another factor of the printing process, which is of particular importance in the printing of newsprint and other highly absorbent stocks, is capillarity. When a thin ink such as news ink (which consists essentially of pigment and mineral oil) is applied to the porous surface of paper, two systems capable of exerting capillarity are competing for the oil in the ink; first, the paper surface, whose minute interstices act as a multitude of capillary tubes, and second, the pigment particles, with the small spaces between them forming the competing capillary system. At the instant of printing, pressure favors the capillary system in the paper, continued penetration, however, depends upon the relative forces of the opposing capillary systems, which is influenced by the coarseness of the paper fibers; the amount and kind of sizing, if any, in the paper; the size and shape of the pigment particles and their concentration in the ink; and the fluidity of the ink as measured by its viscosity and yield value. To obtain a satisfactory printing job, a balance between all these factors must be attained.

All this leads up to the rule generally followed by the ink maker which is *to make his inks of as high viscosity and yield value as is consistent with the paper to be printed and the speed of the press it is to be run on.* Obviously, a faster-moving press will require a thinner ink than a slower-moving press because of the time factor involved in the mathematical formula for viscosity.

With the above generalizations in mind, we may now logically consider the characteristics of paper which influence its printing properties. Careful thought will indicate that the most important characteristics are: (1) smoothness of surface; (2) absorbency of the surface; (3) ink-receptivity, or ink-wettability of the surface; (4) hardness or resistance to picking of the stock; (5) evenness of formation and evenness of caliper of the stock; (6) resilience of the stock.

When ordering ink, the printer should always furnish the ink maker with a sample of the stock the ink is to be used on, so that he may adjust his formula accordingly. This is advisable even though the manufacture of modern printing inks and the modern printing papers have advanced to the stage wherein a considerable margin of safety is generally present between them. May I emphasize that an increased knowledge of printing, and closer co-operation between papermaker, inkmaker and printer alike will simplify the problems of each and result in vastly improved printing.

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A. C. EMBSHOFF, Manager
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The first distinctive principle of the Accelator process is that chemicals are added and chemical reactions take place in the primary reaction zone in the presence of previously formed sludge or slurry. Under these conditions, resulting precipitation takes place on the surface of the old particles and the resulting flocculent or granular product is almost immediately ready for separation. The formation of finely divided reaction products, formed when chemicals are added to the water before sludge contact, and the difficulties of securing coagulation and agglomeration are largely, if not entirely, eliminated.

From the primary reaction chamber the entering raw water and 4 to 5 volumes of recirculated slurry pass into secondary mixing and reaction zones where slow stirring and continued sludge contact bring the treatment reactions to equilibrium before discharge into the outer portion of the Accelator for solids separation.

Leaving the secondary reaction zone—or outer draft tube—the water-slurry mixture is discharged outward and downward—the whole slurry mixture being in rapid, directional motion from which a volume of treated water is displaced upwardly by an equal volume of incoming raw water—the remaining 3 or 4 volumes of circulating slurry returning to the primary mixing zone.

This feature of directed flow and dynamic separation of the treated water from a moving stream or current in a direction approximately at right angles to the main slurry flow is the second distinctive operating principle of the Accelator.

Separating the treated water in this manner takes advantage of the fact that solids in suspension in a fluid in motion do not readily change direction due to their inertia.

In the Accelator, the circulating slurry has a velocity of 2 to 3 inches per second whereas the water which separates has a rising rate of only .06 to .08 inch per second.

Solids formed in the Accelator, in excess of the concentrations desired in the circulating slurry, are removed by means of sludge concentrators—which are simply zones of quiescence in which the sludge may readily settle. Little or no sludge accumulates on the bottom of basin, due to the circulation rates employed.

In a converting plant, two 54 ft. diameter units (each having a rated capacity of 4,200 gpm and operated, on occasions, at rates up to 6,000 gpm) handles a highly contaminated river water of variable turbidity.

The turbidity of the Accelator effluents never exceeds 3 ppm and is usually 1 to 2 ppm. These remarkable results are obtained using aluminum sulphate only as the treatment reagent, the dosage ranging from 2 to 4 grains per gallon (0.3 to 0.6 lb. per 1,000 gallons) with an average of probably 2.5 grains per gallon (0.36 lb. per 1,000 gallons).

Another Accelator clarifier installation, in a converting plant, handling a river water normally of moderate turbidity but subject to sudden change, comprises two 52 ft. diameter units each having a rated capacity of 3,850 gpm.

Specific information on plant operating benefits resulting from the use of water of improved quality provided by the Accelator clarifiers in these two cases has not been made available for publication. It is known, however, that plant shutdowns previously necessary when excessively bad water conditions existed have been eliminated with consequent improvement in operating efficiency and increased production. These benefits alone more than justify the investment and operating costs involved in the Accelator installations.

In a southern pulp and paper mill, a single unit (46 ft. in diameter and having a rated capacity of 3,500 gpm) effects selective removal of calcium bicarbonate—the principal offender in causing scaling difficulties throughout the pulp mill.

Since calcium carbonate only is removed in this treatment process, the sludge produced is practically pure calcium carbonate, which on reburning to produce calcium oxide provides the bulk of the lime required in the causticizing plant.

The reburned sludge provides a quicklime for the causticizing plant containing 87.4 per cent available calcium oxide—equivalent in purity to many commercial quicklimes.

Since the Accelator softening plant produces lime in excess of the amount required for softening, and since the use of this excess in the causticizing plant re-

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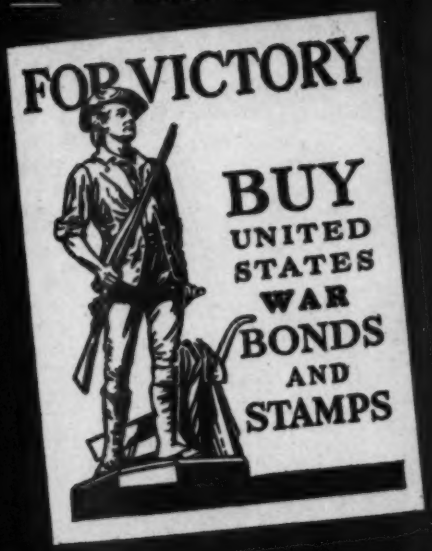

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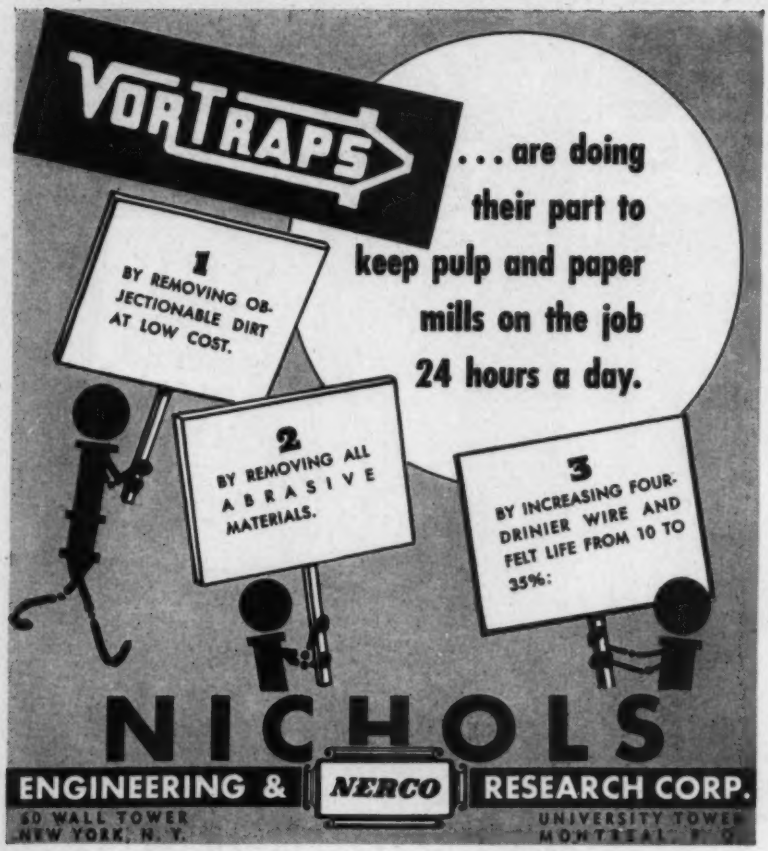
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places lime which would otherwise be purchased, there is no lime cost chargeable to the softening plant, but actually a credit for the lime produced.

Direct benefits derived from the use of treated water are reported as follows:

TABLE IX

	Using Raw Water	Using Treated Water
Fresh lime required per ton of pulp produced—lb....	71	15.5
Oakite solution required for "cleanup" per month —carboys	25	4.5
Frequency of evaporator cleanup—weeks	2	13

It is further estimated that overall production has been increased approximately 20 per cent due to reduction in number of mill shutdowns for cleaning.

So successful was the Accelator in treating the process water that when the necessity arose for an increased supply of boiler feed water of improved quality, a second smaller Accelator softener was installed for further softening the treated process water prior to phosphate softening in an existing hot process water softener.

The accompanying table of analyses (Table XI) shows predicted performance vs. actual performance of an Accelator softener (a single unit 63 ft. diameter having a rated capacity of 7,000 gpm) installed in a southern pulp mill for the selective removal of calcium carbonate. Note that actual performance is much better than predicted performance.

Direct plant benefits credited to the use of treated water are a 14 per cent increase in production capacity of black liquor evaporators; a reduction in chlorine demand for slime control from 650 to 250 lb. per day; water piping corrosion minimized; paper and pulp color improved; and pulp washer capacities increased.

In softening, practically 100 per cent utilization of softening chemicals is obtained as evidenced by the fact that concentrated slurry discharged contains no unreacted treating chemicals. In clarification, Accelator clarifiers almost invariably require a lesser dosage of coagulating chemical than other previously used types of coagulating and clarifying equipment.

TABLE XI—Analyses of predicted performance vs. actual performance

	PREDICTED		ACTUAL	
	Raw	Treated	Raw	Treated
Color	27	15	55	12
Turbidity	15 ppm.	10 ppm.	20 ppm.	5 ppm.
Calcium carbonate	145 "	35 "	140 "	25 "
Magnesium carbonate	89 "	85 "	76 "	55 "
Sodium carbonate	12 "	8 "	25 "	18 "
Sodium sulphate	10 "	16 "	13 "	27 "
Sodium chloride	28 "	28 "	23 "	25 "
Iron oxide	3 "	0 "	3 "	0 "
Silica	*22* "	*20* "	*17* "	*18* "
Total dissolved solids	309 "	192 "	297 "	168 "
Total hardness	251 "	137 "	230 "	91 "
Total alkalinity	262 "	144 "	254 "	108 "

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NEW EQUIPMENT AND SUPPLIES

Portable Car Spotter

Link-Belt Co., 2410 West 18th St., Chicago, has announced a motorized electric car spotter that can be moved to any desired location by one man. To put it into service, the operator anchors the frame with a chain;

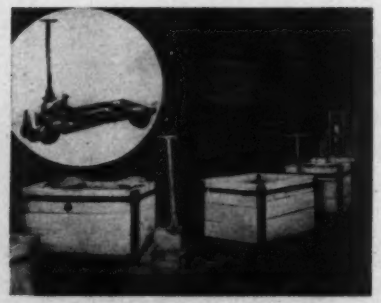
plugs electric cord into nearest power outlet; hooks one end of haulage cable on object to be moved; wraps the other end of cable around capstan; turns on motor; and then feeds away the cable while the machine does the actual pulling.

Dryer Felt Moisture Evacuator

A suctiton box for application to the dryer felt of a paper machine has been announced by P. Smith, Box 43, Three Rivers, P. Q. The box, with or without condensing coils within it, is positioned between two felt supporting rolls in such a way that its top face contacts the felt. Suction is applied to the box through piping connections in the bottom. According to the announcement, this device provides an improved means for removing moisture from a paper machine felt; effects a saving in felt maintenance costs by lengthening the useful life of a felt; enables the dryers to run at lower temperatures; and improves the strength and finish of the paper.

Trailer Type Hand Lift Truck

A hand lift trailer truck, made in capacities up to 20,000 lb. and designated as the *"Load King,"* has been announced by The Yale & Towne Manufacturing Co., Phila-



delphia Division, Philadelphia. This truck, when not operating as a trailer, functions as a conventional hand lift truck, and vice versa. There is a self-coupler attachment at both front and rear. A train is formed by sliding the front end coupler loop through the jaw ends of truck coupler ahead of it, thus pushing up a latch during the make-up which automatically drops into locked position with the completion of the couple. Trailers are disconnected by simply stepping on pedal pad of latch casting at point of desired separation.

Present tractor, or electric lift truck or fork truck supplies the motive power for this equipment when used in trailer service.

Floodlighting Projector

Benjamin Electric Mfg. Co., Des Plaines, Ill., has announced the availability of *Type R D S* floodlighting projector for protective floodlighting and lighting of yards, areaways, and other outdoor work places. The projector is furnished in two models: namely, *R D S 14* for 300 watt and 500 watt general service lamps or 500 watt floodlighting

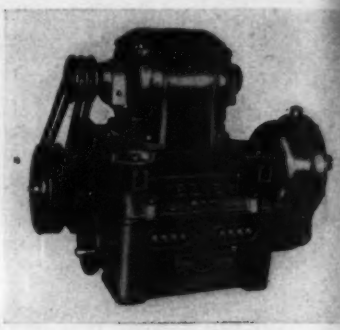
lamps; and *R D S 18* for 750 watt and 1000 watt general service lamps or 1000 watt floodlighting lamps.

Replacing the Benjamin Type R D projector, this unit embodies all the features of its predecessor with the exception that all parts, formerly made of aluminum, brass, or other non-ferrous metals, are of steel or cast iron, specially treated by porcelain enameling, and other rust-proofing to render them exceptionally resistant to corrosive atmospheric influences and weathering.

Variable Speed Mechanism and Gear Reducer in Single Unit

Reeves Pulley Co., Columbus, Ind., has announced the *Reeves Reducer-Type Transmission*, consisting of a standard Reeves variable speed transmission with built-in helical type gear speed reducer. Available in either horizontal or vertical design, and in capacities from 1 to 7½ hp. inclusive, the transmission in various sizes produces ratios of speed variation from 2:1 through 12:1. The reduction gears provide ratios up to and including 6.9:1. Speed changes are effected by turning a handwheel, or, where desired, by mechanical or hydraulic methods.

The reduction gears are mounted on the variable shaft of the transmission, this shaft serving as the input shaft for the reducer unit. The shafts of the reducer, proper,



are mounted on ball bearings. All rotating parts in the reducer are splash lubricated. Three oil plugs are provided, one for determining the oil level, one for filling with oil and one for draining the oil.

The transmission may be equipped for individual motor drive. The motor mounting is directly above the transmission, the motor base being attached to the top of the transmission frame. Connection between motor and constant speed shaft of the Reeves drive may be either silent or roller chain and sprockets, multiple V-belts, or pinion and gear.

Small Universal Angle Drive

Payne Dean & Co., Laconia, N. H., has announced a small universal angle drive for the operation of valves, skylights, ventilators, etc. The unique feature of the drive, as pointed out by the manufacturer, is that one shaft may be rotated around the axis of the other shaft, the latter shaft remaining fixed, through an angle of 180 degrees and locked in any position within this range. When the drive is used with two universal joints, an additional angle of 20 degrees

is available on either shaft, and a further adjustment is obtained by revolving the base through 90 degrees by aid of circular slots.

The unit may be taken apart by removing two taper pins. It is provided with Alemite lubrication for the bearings, and is furnished with or without universal joints.

Although designed for hand operation, the drive is capable of transmitting approximately ½ hp. at speeds not exceeding 300 rpm.

Time to Replace?

Because of today's acute shortages in both manpower and materials, watch your beater bars and bed plates closely. Try to anticipate your replacements as far in advance as possible . . . and then do something about it!

Standard and special bars. Plates in various patterns. Special plates to mill specifications. Also paper trimming knives, chipper knives, Dayton roll bar grinders, Dayton grinding wheels.

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And it is an important question . . . There can be no standard answer because there are no standard conditions. One factor is always present: the tendency of a swiftly moving belt of wire cloth to tear and crack at the edges. Beyond that, practically every Fourdrinier machine has peculiar phases all its own. We endeavor to create an edge that will suit them . . . In order to suit them exactly and to produce the finest paper possible, we offer a variety of selvedges and edge modifications. Moreover, wire manufacturers have developed edge specifications for alloys, tensions and combinations of weave patterns. From the wide range of variations thus afforded you can usually arrive at the one right selvedge which will enable each machine to give you its "most and best."

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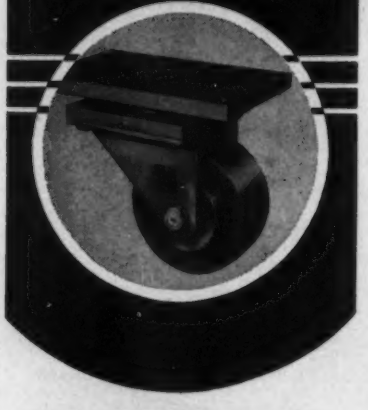

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Electrical Unit Prepares Metal Surfaces for Metallizing

Metallizing Engineering Co., Inc., Long Island City, N. Y., has announced the *Fuse-Bond* unit for preparing metal surfaces electrically for metallizing. The unit operates on any 110 or 220 volt, single phase power line. Contained in a caster-mounted cabinet

measuring 24 in. high, it fuses a rough deposit of electrode metal into the surface to be metallized. Electrodes, up to six at a time, are applied to the work with a special holder. According to the manufacturer, small parts may be prepared with this equipment as easily as large shafts, since there is no excessive heating of the base metal, or disturbing of its physical characteristics.

Arc Welding Electrode Holder

Jackson Products, Detroit, Mich., has announced an arc welding electrode holder, *Model F-1*, made of high conductivity copper alloy and having a rated capacity of 200

amp. The holder is insulated; takes rods up to 3/16 in., has an overall length of 7⅞ in.; weighs 12 oz.; and has mechanical or solder cable connection. Its lightweight and size permits manipulation in tight places.

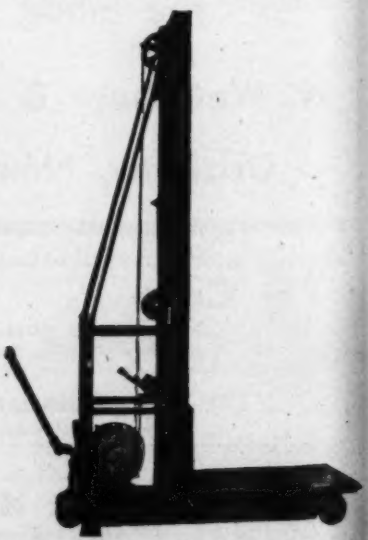
Full-Vision Gas Mask

Acme Protection Equipment Co., Pittsburgh, has announced the *Improved Acme Full-Vision All-Purpose Gas Mask*. This unit carries the United States Bureau of Mines approval for respiratory protection in atmospheres containing 16 per cent or more of oxygen or in which a safety lamp will burn, and not more than 2 per cent acid gases, organic vapors, or carbon monoxide, 3 per cent ammonia, or 2 per cent total of poisonous gases when more than one class is present, and smokes from ordinary fires. This approval also applies to limited protection against dusts, fumes, mists, and fogs, but not toxic smokes of warfare.

The assembly consists of a facepiece with head harness, a canister with harness, and a timer. The facepiece fits snugly but without undue pressure the face of the wearer. The canister is designed for two hours of actual service anytime within a year. It connects through a flexible tube to the intake on the facepiece. The timer, mounted on top of the canister assembly, permits the user to see at a glance how much service life remains in the canister. The complete unit with instructions for use is housed in a waterproofed fiber case.

Air Power Stacker

Lewis-Shepard Sales Corp., Watertown, Mass., has announced a portable elevator, powered by an air motor, for use in connection with various hazardous operations. A "dead man" cable control stops the air motor and stacker platform the instant the



operator removes his hand from either one of the dual, hold-over controls. The stacker is produced in the same speeds and capacities as the standard Lewis-Shepard line of electric powered stackers; also in standard hinged and telescopic types.

WILL BE BACK—

AFTER WE BEAT THE AXIS

Until then all of our plant facilities are being used to make equipment needed by our fighting forces. Barking drums, screens, chip crushers, pulpwood chippers, wood cleaners—all paper mill and wood room equipment—withdraw from our production lines except where permission to make such equipment is granted by W.P.B. Necessities of war take their places. You'll agree with us that's the all-important job now. But, when all-out efforts triumph we shall be better able to meet your needs for new machinery and parts.

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WAUSAU, WISCONSIN

KEEP YOUR BELTS RUNNING

1. Inspect your belts and fastenings frequently.
2. If you find that the lacing is badly worn and the belt joint is badly frayed or worn relace the belt with Alligator Steel Belt Lacing.
3. Don't throw worn belting away. Worn belting can be reconditioned or you can easily make up a serviceable belt by cutting out the best sections of old belts and then splicing them together with Alligator Steel Belt Lacing.
4. Be sure and use the size of Alligator Steel Belt Lacing recommended for the thickness of belt to be spliced.
5. Where belts are to be laced that are wider than the standard lengths of 6, 8 or 12 inches, Alligator Belt Lacing is available in continuous lengths for any width of belt. The continuous length is easier to apply and makes a more uniform and longer lasting joint.
6. Write for our Bulletin A-60 that gives complete details on how to lace flat belts of leather, rubber, balata, canvas, from 1/16" to 5/8" thick and as wide as they come.

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● Lacing can be applied right at the location of the belt without even taking the belt off the line shaft. Alligator has strength with long life, compression grip, is smooth on both faces and the joint is easy to take apart at any time regardless of the amount of wear.

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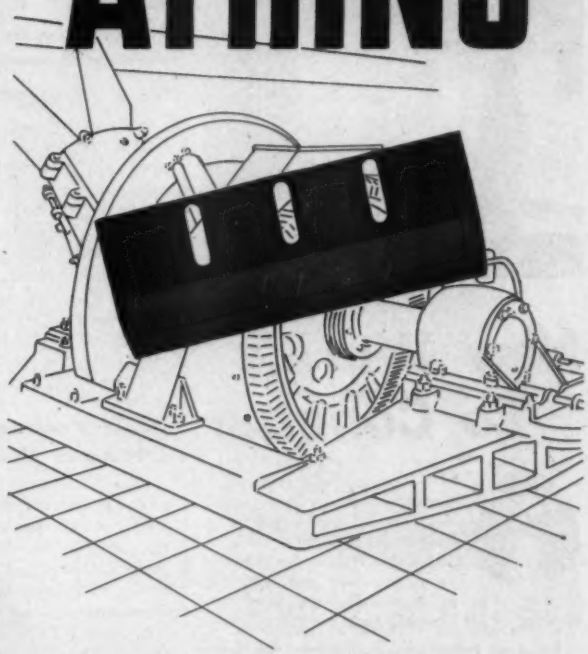

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It takes knives that stay sharp right to the end of long production runs to cut high quality chips—uniform, unbruised, permeable chips. That's why Atkins Chipper Knives are standard in so many large plants today. Their edge-holding properties permit increased production of chips between regrindings . . . and are a real factor in conserving the critical steel that goes into Atkins Chipper Knives. For when you buy Atkins, you buy fewer knives. Next time you need replacements, order Atkins!

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TECHNICAL DEVELOPMENTS

These abstracts are of the latest developments found in the American and foreign press.

Wet Strength of Paper

In large scale experiments, it was shown that by the use of 2-3% urea-formaldehyde resin, the wet tensile strength could be raised to 50% of the dry strength of the paper sheet. On storage, this wet strength increased. Paper impregnated with urea-formaldehyde may be used for spinning paper, binder twine, and for paper bags, which must withstand exposure to dampness, or which are used in packaging moist foodstuffs. S. Lindberger. Svensk Papperstidn. 45, No. 19, 397 (1942); through B. I. P. C. 13, 295 (1943).

Food Packaging for Overseas Use

The Q.M. Corps is required to ship food products like dehydrated fruits, vegetables, milk powder, eggs powder, etc., to the arctic and into the tropics. The packaging problem is rendered difficult by the unavailability of rubber, tin, aluminum and steel. Flexible packaging materials are now generally used. Samples of films that are sent to the Subsistence Research Laboratory are subjected to vapometer cup tests, and subsequently special tests are applied.

The containers should be able to withstand mechanical abuse, exposure to damp ground and to rain. Interest is also manifest in materials that resist insect infestation, that are greaseproof and which prevent transfer of odors. Efforts have been made to package the Army's food in materials resistant to poison gases. Proteins, regenerated cellulose, and polyvinyl resins give good resistance but asphalt and waxes offer less protection. Gassed food stores cannot be easily decontaminated. Robert R. Melson. Ind. Eng. Chem. 35, 16 (1943).

Dye Sorption by Cellulose

The attempt was made to characterize pulp by determining its specific surface through the sorption of Congo red. Untreated cellulose and products obtained by beating or grinding were used. The adsorption isotherm for Congo red-pulp was investigated at various dye-liquor concentrations (from 0.06-5.0%) at 75 C., in the presence of 0.2% NaCl. Even at the higher dye concentrations, the sorption of the dye does not reach a state of saturation. Evidently a moderate surface distribution of the dye is obtained and there is no evidence of a thick dye precipitation on the fiber. X-ray photographs of pulp dyed with Congo red and of artificial mixtures of pulp and precipitated Congo red bear out the previous statement. Microscopic sections indicate that the fiber is uniformly dyed.

The fibers studied were: two spruce pulps (one of which was taken wet directly from the manufacturing process), ramie, flax, viscose rayon, mercerized ramie and mercerized pulps. The fibers were either beaten or ground in a porcelain "Vibratom" model vibration mill. Differences were noted in dye sorption with fibers of various types, and there were also differences due to the pretreatment received. Retention of dye (in pulps ?) is doubled by mercerization, and approaches the sorption capacity of viscose rayon. However, mercerization seems to have a negligible effect on ramie. Depending on the type of fiber used, dry grinding increases the dye sorption 2-4 times. Wet grinding results in increasing the dye retention from 2 to 4 times, depending on the type of fiber used. If the ground fibers are heated with water, crystallization takes place and dye sorption decreases. This is explained by the new arrangement of the cellulose lattice "opened up" by grinding. K. Hess and W. Grimberg. Kolloid-Ztg. 87 (1941) through C. A. 36, 7310 (1942).

Determination of Sulphur In Cellulose Derivatives

The authors developed a method for determining small amounts of sulphur in cellulose derivatives, which is based on oxidation with nitric acid and fusion with potassium nitrate. Cellulose acetates were prepared in which there were two types of sulphates present; in salt form and combined (as ester) with the cellulose. The former may be readily washed out by rinsing with (0.1%) HCl, but this does not remove the combined sulphates. This forms a basis for differentiating between the two types of sulphate sulphur. However, some of the combined sulphates may be split off by drying the acetate as shown by the reduction in sulphur content by HCl rinses after such treatment. Carl J. Malm and L. J. Tanghe. Ind. Eng. Chem., Anal. Ed. 14, No. 12, 940-2 (1942).

Zein in Lithograph Papers

Zein has been substituted for casein in clay coatings, but the water resistance has been too slow to satisfy the lithographers. The water resistance did not develop adequately until after aging of the treated papers, and this was a matter of several weeks. Water resistance is essential since usually the clay-coated papers are subjected to a water spray before ink is applied. This prevents cracking and makes the surface flexible. Quick water resistance in zein papers is obtained by treating with solutions of lead acetate or aluminum formate. Formulas are given. A. L. James. Paper-Maker 104, 148 (Oct., 1942), through B.I.P.C. 13, 235 (1943).

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. . . But let's go back to the chain itself. A dry chain wears prematurely—lengthens itself out of pitch. And a chain out of pitch cannot seat itself properly in the wheel sockets. Another vicious result of wear.

. . . So please—now that all steel products are critical—lubricate your load chain regularly and make it last: twice, five times, ten times, yes—**fifteen times** as long.

Send today for a free copy of the Wright Crane Signal Chart. This chart (36" x 24") can be tacked up on the bulletin board to teach the men standard crane signals which will speed operation and promote safety.

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PAPERMAKING PATENTS

IN THE UNITED STATES — Compiled by James Atkins, Registered Patent Attorney

Inquiries should be addressed to James Atkins, Munsey Building, Washington, D. C.

Bleaching of Ground Wood Pulp with Preliminary Bisulphite Treatment

Patent No. 2,290,601. Joseph S. Reichert, Samuel A. McNeight, and Howard L. Potter, Niagara Falls, N. Y., assignors to E. I. du Pont de Nemours & Company, Wilmington, Del., a corporation of Delaware. No Drawing. Application February 16, 1940. Serial No. 319,238. 7 Claims. (Cl. 8—104). The process of bleaching ground wood pulp in order to prepare a ground wood pulp of high brightness for use in the paper making art which comprises: subjecting said ground wood pulp to an acid sulphite bleach; and thereafter subjecting said ground wood to the action of an aqueous alkaline oxidizing bleach bath containing a peroxygen compound selected from the group which consists of hydrogen peroxide, the alkali metal peroxides, and the alkali metal perborates, said aqueous alkaline liquor having a pH within the range 10.0 to 11.0 during the major portion of said oxidizing bleach step, the temperature during said latter oxidizing bleach step being maintained within the range 80 to 120 deg. F.

Alpha Cellulose Pulp

Patent No. 2,295,215. Herman L. Joachim, Los Angeles, Calif., assignor to Maui Agricultural Company, Ltd., a corporation of Hawaii. Application September 16, 1940. Serial No. 356,929. 4 Claims. (Cl. 8—105). A process for purifying a substantially delignified but substantially otherwise untreated bagasse pulp comprising treating an aqueous solution of said pulp with free chlorine in an amount of approximately 75% of the total chlorine demand of the pulp at about room temperature, removing resultant chlorination liquor from the pulp and washing the pulp, treating the washed pulp with an alkaline solution at an elevated temperature, washing the pulp, treating the washed alkali-treated pulp with a hypochlorite solution containing substantially the additional chlorine required to chlorinate the remaining impurities, and washing the treated pulp.

Paper Testing Machine

Patent No. 2,291,027. Arthur W. Cole, Kalamazoo, Mich., assignor to Rex Paper Company, Kalamazoo, Mich., a corporation of Michigan. Application December 9, 1940. Serial No. 369,367. 7 Claims. (Cl. 73—51). A paper inspecting device of the type described for detecting flaws in coated paper webs and the like, comprising a frame, a hard surfaced roller accurately journaled in roller bearings on the frame, a bracket on the frame having a blade support pivoted thereon, a blade rotatably mounted on said support in roller bearings, said blade and roller being substantially coextensive in width with the web and the blade being adapted to be positioned with the free edge thereof in close adjacency to the periphery of the roller whereby to engage protuberant imperfections in the web in excess of a predetermined allowable height, means for feeding the web over the roller, adjustable means engaging said support to pivotally adjust the same and determine the position of the blade relative to the roller, and a stop coacting with said blade to limit the movement thereof in the direction of movement of the web whereby the blade in engaging said imperfections tears the web.

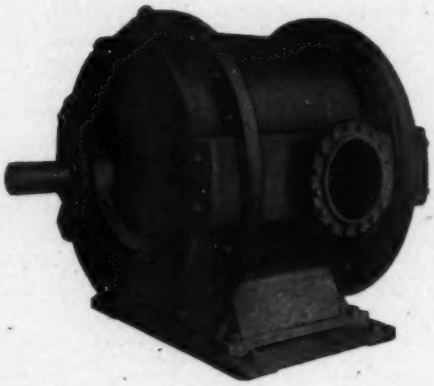
Method of Producing Paper Having High Wet Strength and Product Thereof

Patent No. 2,291,080. Raymond P. Hofferbert, Stamford, Conn., assignor to American Cyanamid Company, New York, N. Y., a corporation of Maine. No Drawing. Application February 6, 1940. Serial No. 317,527. 5 Claims. (Cl. 117—155). A process of increasing the wet strength of paper which comprises treating paper with an aqueous solution of an aminotriazine-aldehyde condensation product and adjusting the content of said condensation product so that the proportion thereof is about 0.5—5% of the weight of the paper (dry basis) and polymerizing said condensation product.

Paper Pulp Screen

Patent No. 2,293,978. Nils Walfrid Jönsson, Obbola, Sweden. Original application September 15, 1936. Serial No. 100,958. Divided and this application February 23, 1940. Serial No. 320,485. In Sweden November 2, 1933. 1 Claim. (Cl. 92—33). In an apparatus for screening cellulosic pulp the combination of an elongated screen extending in the longitudinal direction substantially horizontally from an inlet at one end to an outlet at the other end, and comprising in the direction of flow first a relatively short portion extending steeply downward, and then as continuation thereof a portion, everywhere inclining less steeply to the horizontal plane than the first portion and from a lowest point rising continuously to the outlet portion of the screen, elastic and substantially vertically yielding means connected to the two longitudinal sides of the screen for supporting the same, means for vibrating the screen united with the middle portion of the screen sides between the inlet end and the outlet end so that the inlet end as well as the outlet end of the screen perform orbital vibrations, and means beneath the screen for damming up liquid so that the screen will be at least partially surrounded by liquid on both sides.

ONLY NASH VACUUM PUMPS HAVE ALL THESE FEATURES



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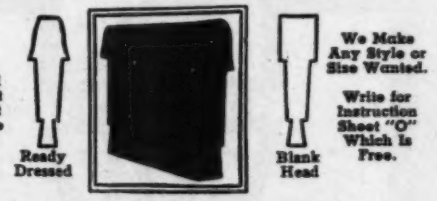

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Machinery for Ground Wood and Chemical Pulp Mills.

J. W. HEWITT MACHINE CO., Inc.

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Builders of

Paper Making Rolls and Special Machinery
Roll Grinding a Specialty

WE ARE HELPING ON THE BIG JOB

ARMY E NAVY

On parts of equipment for combat service calling for close precision, or on standard items of manufacture, Stickle production today is devoted exclusively to helping forward the BIG JOB of winning the war.

Naturally, we are proud of our part in the building of vital equipment that is enabling our fighting men to smash the enemy forces. But we are alike proud of the fact that standard items of Stickle Equipment are aiding men and machines, on production lines in plants all across the country, to produce other war essentials faster and better.

The requirements of war have called for the installation of much new Stickle Equipment. But Stickle Equipment installed in times of peace—much of it several years ago—in plants of many types of essential industry and service, as well as throughout the paper manufacturing field, is doing its part in better meeting the tremendous demands of today.

BE UP TO THE MINUTE ON MAINTENANCE

● Under present necessities, maintenance of equipment is of the utmost importance. A check of your Stickle Equipment by one of our engineers could easily be the means of saving equipment that is difficult to replace and prevent an expensive shut-down. Periodical checking of equipment, at a nominal cost, is practical in normal times, but during the present emergency when your plant is under the necessity of doing more with less, its importance is much greater.

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STEAM SPECIALTIES COMPANY

2225 VALLEY AVENUE, INDIANAPOLIS, INDIANA

New Catalogues, Publications, and Ass'n Reports

American-LaFrance-Foamite Corp., Elmira, N. Y.—This company has announced two new fire extinguisher charts showing the operating characteristics of first aid hand fire extinguishers and wheeled engines. The charts clearly and concisely tabulate the several types of hand fire extinguishers and wheeled engines, and their suitability or otherwise as applying to Class "A," "B," and "C" fires, in accordance with Underwriter's Laboratories classification. For convenience, a Class "D" is added to cover the fire hazards of automobiles, commercial trucks, etc., and a Class "DT" to cover tank-trucks and trailer-tractors. The charts may be secured from the company upon request.

Combustion Engineering Co., Inc., New York City—Combustion Engineering has just issued a new 20-page bulletin entitled "Fundamentals of Stoker Operation and Maintenance." The booklet presents a series of separate advertisements designed to aid the war effort in telling owner and operator—"How to Make your Stoker Last Longer"—by setting forth fundamental facts concerning operation, lubrication, inspection and maintenance of stokers of all types.

General Printing Ink Corp., New York City—For the past three years this company has sponsored printing and advertising clinics; however, as it is impossible to continue these PAC meetings, they have converted to *PAC in PRINT*, the first issue of which has just been released. "A Material Survey of the Graphic Arts Industry" is the title of the first issue, and in it six authorities have discussed 1943 prospects on a number of material items important to the industry. Subsequent issues will be devoted to subjects of vital interest to American business. Copies are available upon request.

General Electric Co., Schenectady, N. Y.—General Electric has recently prepared a booklet No. GEA-1145-D, on "Type D Mechanical-Drive Turbines." It contains general specifications of the various types, as well as pictures of them. Another section is devoted to the construction features of Type D turbines and modifications that make them adaptable to special requirements.

D. W. Haering and Co., Inc., Chicago—A new fifth edition of this company's booklet on "Organic Methods of Scale and Corrosion Control" is just off the press. This new 28-page booklet, discussing the use of organic chemicals in water treating, presents the newest information on scale and corrosion control. A number of charts, graphs, tables, and halftones to illustrate the usefulness of organic chemicals in water conditioning and point the way to substituting these chemicals for products now obtainable with difficulty, if at all, are incorporated. This edition introduces a new section tabulating the physical and chemical properties of the various Glucosates developed by Haering Research. It is available without charge by writing the company, 205 W. Wacker Drive, on business letterheads.

Leeds & Northrup Co., Philadelphia—Catalogue N-23-163 has just been published by this company and deals with Micromax temperature instruments for the steam plant. Equipment described consists of Micromax temperature recorders for use with thermocouples or with thermohm resistance thermometer bulbs. Applications to temperature measurement of steam, feedwater and cooling water, and to fuel, combustion air and flue gas are described in detail in the 36-page booklet. Copies are available from the company, 4934 Stenton Avenue.

Mine Safety Appliances Co., Pittsburgh—This company has just announced that a comprehensive 32-page handbook entitled "How to Make Your Safety Equipment Last Longer" is ready for distribution without charge. The handbook covers every type of personal protective equipment, and details the practical "do's and don'ts" of safety equipment care for key personnel. Marginal drawings illustrate the text.

Preferred Utilities Co., Inc., New York City—A new 48-page booklet, "Dividends from your Power Plant," has just been published by this company. It discussed subjects such as, the dollars and cents importance of boiler efficiency, the relation between steam costs and profits, natural versus mechanical draft, carbon dioxide and carbon monoxide, excess air, and factors that govern labor costs in the boiler room. Copies of the booklet are available without cost.

Reeves Pulley Co., Inc., Columbus, Ind.—This company has just published a new catalogue, No. TR-432, covering their new unit, the Reeves reducer-type transmission. The catalogue contains a description of the unit as well as engineering data and rating tables which are necessary for the selection of a unit of the proper size.

United States Stoneware Co., Akron, Ohio—Bulletin No. 1502 has just been issued by this company, covering Resilon corrosion-resistant tank linings. The bulletin contains a complete description of Resilon, what it is, its physical and chemical characteristics, its applications, as well as its application in the plant.

Vitamins Industrial, Chicago—"Vitamin Protection Means Production and Profit" is the title of a new booklet just issued to industrial executives by this company. The booklet contains the lat-

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Hot Acid Cooking and Recovery Systems
Chemipulp--K-C Digester Circulating Systems with Chip Distributor and Full Automatic Controls

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Chemipulp--K-C Improved Acid Plants
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FLAMEPROOFING AGENTS
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AND OTHER SPECIALTIES FOR THE PAPER INDUSTRY

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CLAFLIN REFINER

for maximum strength development with minimum cutting. Develops high Mullen with high tear and at high freeness.

•

Special hydrating filling, particularly advantageous for kraft pulps and furnishes requiring long beating.

•

Replaces beaters and jordans.

•

Due to results achieved with No. 2 size, plans are being made for a larger size.

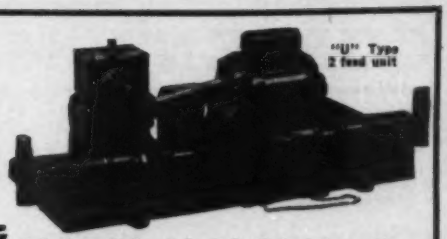
•

With exception of maintenance parts and repairs, our plant facilities are being used for Defense products.

THE HERMANN MANUFACTURING CO.

LANCASTER, OHIO

For FEEDING and INJECTING



"U" Type 2 feed unit

Coloring—Soda Ash—Salt Cake—Lime Slurry — Boiler Compounds — Aluminum Sulfate — Caustics — Molten Sulphur — Size — Etc.

Precision PUMPS

Vertical Composite Double Ball Check Valve with suction and discharge in the same body.

Hills-McCanna Proportioning Pumps are built on the positive displacement principle, assuring definite delivery of exact measured dosages—maintaining fixed proportions of formulae—accurate to ±1½%—eliminating waste of materials pumped—have close, easy adjustment—give long, satisfactory service. Volumes from 0 to 1,800 g.p.h. Pressures to 22,500 p.s.i. Check valves are provided on each type pump to suit materials handled.

Write for Catalog P-41

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PROPORTIONING PUMPS • AIR & WATER VALVES • CHEMICAL VALVES
MARINE VALVES • FORCED FEED LUBRICATORS • DOWMETAL CASTINGS

est information on vitamins and the effect of their regular distribution to employees by industrial concerns. The various plans of distribution now in use are set forth, and case histories are briefly given. Copies may be obtained from the company at 22 North Bank Drive.

Books

The Asbestos Factbook—This booklet of 16 pages includes information on the origin, sources, uses, and anlysis of asbestos as well as other interesting facts about the material. The price is 10 cents a copy; the publisher, Asbestos, Inquirer Bldg., Philadelphia.

Empirical Equations and Nomography—Dale S. Davis, the author, has put material drawn from 18 years of industrial, consulting, and teaching experience into this volume. As indicated by the title, one part of the book is devoted to the subject of empirical equations; a second part, to nomography. The data on empirical equations is treated in three chapters; namely, Fundamental Forms, Special Methods for Two-Variable Correlation, and Three-Variable Correlation; the data on nomography in seven chapters: Addition Charts, Logarithmic Charts, Recurrent Variable Charts, Nonlogarithmic Multiplication Charts, Combination Charts, Line Coordinate Charts, and Special Slide Rules. Designed to speed-up the work of the engineer in performing frequent and necessary calculations, the book totals approximately 200 pages, and includes 70 illustrations. It is priced at $2.50 by McGraw-Hill Book Co., Inc., 330 W. 42nd St., New York, the publisher.

Sixteenth Census of the United States, Manufactures, 1939: Volume I—Bound in buckram and priced at $1.75 a copy, this book furnishes statistics on the various manufacturing industries of the United States. The statistics cover such information as personnel, size of establishments, type of organization or control, power equipment and energy consumption, fuel consumed, inventories, expenditures for plant and equipment, and materials consumed in selected industries. The personnel data reveals that 134,530 persons (120,201 males, 14,329 females) were employed in paper and paperboard mills; 32,534 persons (32,168 males, 366 females) in pulp mills. According to data on power equipment and energy consumption, the horsepower of prime movers in paper and paperboard mills and in pulp mills combined totals 2,745,059 or 2,799 per 100 wage earners. Other data in reference to the pulp and paper industry are equally impressive. The book is for sale by the Superintendent of Documents, Washington, D. C.

The Blue Book of Southern Progress—Published annually by Manufacturers Record Publishing Co., Baltimore, Md., the 1942 edition of this work has been issued. Made up in the same general style as preceding issues, the book reveals what the South has done and is doing industrially. Facts and figures cover the manufacturing industries, agriculture, mining and minerals, construction, transportation, power, banking, insurance, and foreign trade. Figures on area and population, names of state officials and important commissions, and an economic summary complete the text material. The book (paper-covered) is priced by the publisher at $1 per copy.

Association Reports

All of the orders which affect the industry emanate from the OPA and WPB and clear through the office of E. W. Tinker, executive secretary of the American Paper and Pulp Association. Copies of all government orders are sent by the Association to members. Listed below are releases sent out during April by the APPA. Any correspondence with that office regarding these releases should carry identifying titles and numbers as listed.

Labor Relations

General No. 1—Women in the Paper and Pulp Industry Survey—Report shows the results of a recent survey of women employed in the industry and a statistical summary of the occupations now being filled by women in the pulp and paper industry.

Federal Regulations

Paper Production No. 12 — M-241-a (Amended) — Paragraph (b) (2) of M-241-a has been amended as of April 7.

Materials and Supplies No. 11—Casein—Maximum Price Regulation 289, which regulates prices on certain dairy products, has been amended to include casein.

Materials and Supplies No. 12—Wood Pulp Supplies.

Materials and Supplies No. 13—Controlled Materials Plan 5—Amendment No. 1.

Materials and Supplies No. 14 — M-307 Casein—General Preference Order M-307 started the allocation of Casein on May 1, requiring users to file Form P.D. 600 as soon as possible for requirements covering May and June, and quarterly thereafter.

Prices No. 3—Maximum Export Price Regulation Second Revision—This revision makes several changes in the Regulation.

Transportation—O.D.T. No. 10—ODT Automotive Maintenance Report—Attention of paper and pulp manufacturers is called to a series of reports on subjects of automotive maintenance being published by the Office of Defense Transportation.

Transportation—O.D.T. No. 12 — Certificates of War Necessity and "T" Ration Gasoline Coupons Not Transferrable with Titles to Commercial Motor Vehicles.

Labor—War Manpower Commission No. 14 —Regulation No. 4 Restricting Transfer of Workers.

Labor—Wage and Salary Stabilization No. 1 —Executive Order 9328—Stabilization of wages, prices and salaries.

CURRENT MARKET QUOTATIONS

RAGS (Domestic)

NEW RAGS — *per cwt.*

OPA ceiling prices in sales to consuming mills delivered buyer's usual receiving point, with brokers' allowance not in excess of 5 per cent.

Blue Overalls	-5.50
Corduroy, Men's	-3.50
Corduroy, Ladies'	-3.00
Washables, No. 1	-3.00
Percales	-4.75
New Soft Blacks	-3.75
Light Prints, No. 1	-4.50
Khaki Cuttings—	
Bleachable	-4.25
Unbleachable	-3.50
New White Canvas	-6.50
New Mixed Blacks	-3.25
Canton Flannels, Bleached	-7.00
Shirt Cuttings—	
New White No. 1	-7.25
No. 1 White Headings	-7.25
White Shrunk	-5.00
Silesias No. 1	-5.75
New Unbleached	-7.50
Fancy	-3.50
Linen Cuttings—	
American	-5.00
White	-14.00
Grey	-14.00

RAGS (Domestic)

f. o. b. New York City

OLD RAGS

OPA ceiling prices in sales to consuming mills f. o. b. cars at points of shipment, with brokers' allowances of $1 to $2 a ton depending on the value of the grade involved.

	per ton
Roofing—	
No. 1	31.00
No. 2	29.00
No. 3 and No. 4	27.00
Twos and Blues—	
Repacked	44.00
Thirds and Blues—	
Repacked	44.00
Miscellaneous	36.00
Whites, No. 1—	
Repacked	76.00
Miscellaneous	64.00
Whites, No. 2—	
Repacked	58.00
Miscellaneous	53.00

RAGS (Foreign)

ex dock New York City

NEW RAGS — *per cwt.*

Nominal

- New Dark Cuttings
- New Mixed Cuttings
- New Light Silesias
- Light Flannelettes
- Unbleached Cuttings
- New White Cuttings
- New Light Oxfords
- New Light Prints

RAGS (Foreign)

ex dock New York City

OLD RAGS — *per cwt.*

Nominal

- No. 1 White Linens
- No. 2 White Linens
- No. 3 White Linens
- No. 4 White Linens
- No. 1 White Cottons
- No. 2 White Cottons
- No. 3 White Cottons
- No. 4 White Cottons
- Extra Light Prints
- Ord. Light Prints
- Med. Light Prints
- Dutch Blue Cottons
- French Blue Cottons
- French Blue Linens
- Checks and Blues
- Linsey Garments
- Dark Cottons
- Old Shapperies

ROPE and BAGGING

f. o. b. and ex dock New York City

	per cwt.
Gunny No. 1—	
Foreign	Nominal
Domestic	4.40 to 4.60
Wool Tares—	
Light	4.00 to 4.25
Heavy	4.25 to 4.50
No. 1 Scrap Bagging	3.75 to 4.00
Manila Rope—	
No. 1 large	-*115.00
No. 1 small	-*105.00
Sisal Rope—	
No. 1 large	-*95.00
No. 1 small	-*85.00
New Burlap Cuttings	5.75 to 6.25
Jute Threads—	
Foreign (Nom.)	6.25 to 6.75
Domestic	5.50 to 6.00
Strings—	
No. 1 sisal	-*80.00
No. 2 sisal	-*60.00
Soft Jute	4.75 to 5.00
Mixed	1.25 to 1.50

*OPA ceiling price per ton f. o. b. shipping point.

WASTE PAPER

OPA ceiling prices f. o. b. points of shipment, with brokers' allowance of 4 to 9 per cent.

	per ton
Shavings—	
White Env. Cuts, One-Cut	67.50-
Hard White Env. Cuts	62.50-
Hard White, Unruled	57.50-
Soft White, One-Cut	57.50-
Soft White, Mix.	43.00-
Fly Leaf, No. 1	33.50-
Fly Leaf, Woody, No. 1	25.00-
No. 2 Mixed Col. Woody	18.00-
Flat Stock—	
No. 1 Heavy Magazines	33.50-
Mixed Books	17.00-
Ledger Stock—	
No. 1 White	43.50-
No. 1 Mixed (Colored)	37.50-
Manilas—	
New Env. Cuttings	53.00-
New Env. Cuts, One-Cut	57.50-
Extra Manilas	37.00-
Manila Tab Cards, Free of Ground Wood	45.00-
Ground Wood Manila Tab Cards	27.00-
Kraft—	
Envelope Cuttings	65.00-
Mixed Env. or Bag Cuts	55.00-
Tripled Sorted No. 1 Brown	50.00-
New 100% Cor. Cuts	45.00-
No. 1 Old Assorted	35.00-
News—	
White Blank	33.00-
Overissue	17.00-
No. 1 Baled	15.00-
Old Kraft Corrugated Containers	30.00-
Old Corrugated Boxes	16.50-
New Corrugated Cuts	18.00-
Mill Wrappers	17.00-
Box Board Chips	14.50-
No. 1 Mixed Paper	14.00-

CHEMICALS

f. o. b. shipping point

Alum (Papermakers)—	
Lump, cwt.	4.25-
Ground, cwt.	4.00-
Powdered, cwt.	4.40-
Blanc Fixe—	
Pulp, bulk, ton	40.00 to 46.50
Dry, barrels, pound	60.00 to -
Bleaching Powder—	
Drums, cwt.	2.25 to 2.10
Casein (Domestic Standard)—	
20-30 mesh (bags), lb.	19.00 to 20.00
80-100 mesh (bags), lb.	19.50 to 20.50
Argentine, lb.	—
China Clay—	
Domestic Filler Bulk (mine) ton	7.50 to 15.00
Domestic Coating Bulk (mine) ton	12.00 to 22.00
Imported (ship side) Bulk (lump) ton	15.00 to 26.00
Chlorine—	
Tank cars (wks) cwt.	2.00 to 2.25
Gelatine (silicin), lb.	.90 to .95
Glyc. (C.P.) drums, lb.	18.25 to 18.75
Litharge, powd., bbl., lb.	.09 to -
Rosin (Gum)—	
New York, per 100 lbs.	
E	3 91-
F	3.97-
G	4.04-
WW	5.16-
Rosin (Wood), carlots	3.30-
Salt Cake—	
Dom. bulk (wks) ton	15.00 to 16.00
Imp. bulks on dock— (Atl. ports) ton (Nom.)	20.00 to
Soda Ash—	
Bulk (works), cwt.	.90 to .95
Paper Bags, cwt.	1.05 to 1.35
Barrels, cwt.	1.05 to 1.35
Soda (Caustic)—	
Solid, drums, cwt.	2.30 -
Ground and flake, drums, cwt.	2.70 -
Sodium Silicate—	
60 deg., 55 gal. drums, (works) cwt.	1.55 to 2.05
40 deg., 35 gal. drums, (works) cwt.	.80 to 1.45
Starch—	
Pearl, 140 lb. bags, cwt.	3.10-
Pearl, barrels, cwt.	3.20-
Paper (Sp.) bags, cwt.	3.20-
barrels, cwt.	3.30-
Sulphur (crude)—	
(mine) bulk, long ton	18.00 to 20.50
Talc—	
Dom. 100 lb. bags (mine) ton	18.00 to 21.00
Imp. bulk, ton (Nom.)	—
Titanium Dioxide—	
Barium Pig., bbls., lb.	.05¾ to .06
Calcium Pig., bbls., lb.	.05 to .05¼
Zinc Sulphide, bbls., lb.	.06¼ to .06½

WOOD PULP

OPA maximum prices applicable to wood pulp delivered to consumer mills located East of the Continental Divide exclusive of Denver, Colo.:

Bleached softwood sulphite	76.00
Unbleached softwood sulphite	66.00
Bleached hardwood sulphite	73.50
Unbleached hardwood sulphite	63.50
Bleached Mitscherlich sulphite	81.00
Unbleached Mitscherlich sulphite	72.00
Northern bleached sulphate	86.00
Southern bleached sulphate	79.00
Northern semi-bleached sulphate	82.00
Southern semi-bleached sulphate	75.00
Standard news print siderurus	46.00
Northern unbleached sulphate	73.00
Southern unbleached sulphate	63.50
Bleached soda pulp	86.00
Unbleached soda pulp	82.00
Ground wood pulp	46.00
Sulphite screenings	38.50
Sulphate screenings	38.00
Ground wood screenings	30.00
Northern unbleached sulphate siderurus	73.00
Southern unbleached sulphate siderurus	63.50

PAPER

f. o. b. New York City

	per ton
Boards—	
Binders	84.00-
Chip	45.00-
Chip, sgl. mls. lined	60.00-
Coated, white patent .016	80.00-
.020 and heavier	75.00-
Kraft liner	63.00-
News	48.00-
Book (cased)	*per cwt.*
No. 1 Coated	15.50-
No. 2 Coated	14.00-
No. 3 Coated	13.25-
No. 4 Coated	12.75-
No. 2 Offset	11.00-
A Grade Super	10.75-
B Grade Super	10.25-
Bonds (Rag Content)—	*per cwt.*
100% Rag Ext. No. 1	42.50 to 46.00
100% Rag	35.00 to 37.75
85% Rag	
75% Rag	25.00 to 27.00
65% Rag	
50% Rag	20.80 to 22.75
25% Rag	18.20 to 20.00
Regular Colors	1.00 cwt. extra
Bonds (Sulphite)—	*per cwt.*
No. 1	11.70-
No. 2	10.75-
No. 4	9.90-
Colors	1.00 cwt. extra
Glassine (f. o. b. mill)—	*per cwt.*
Embossed (25 lb. up)	13.75 to 14.25
Bleached (25 lb. up)	12.75 to 13.25
Unbleach. (25 lb. up)	11.50 to 12.00
Greaseproof—	
Bleach. (25 lb. up)	11.00 to 11.50
Unbleach. (25 lb. up)	10.00 to 10.50
Ledgers (Rag Content)—	
100% Rag Ext. No. 1	*per cwt.* 41.40 to 48.50
100% Rag	36.25 to 39.25
85% Rag	32.20 to 37.75
75% Rag	26.25 to 28.00
65% Rag	22.80 to 27.75
50% Rag	22.10 to 24.25
25% Rag	19.50 to 21.50
Regular Colors	1.00 cwt. extra
Ledgers (Sulphite)—	*per cwt.*
No. 1	13.00-
No. 2	12.00-
No. 4	11.30-
News—	*per ton*
Rolls (Contract)	54.00-
Rolls (Spot)	(nominal)
Sheets	62.00-
Tissues (Carlots)—	*per ream*
White, No. 1	1.12½ to 1.20
White, No. 2	1.00-
Bleached Anti-Tarnish	1.15-
Colored	—
Anti-Tarnish Kraft	.70-
Manila	.90 to .95
Napkins, semi-crepe (12¼ lb. to M shts.) per ea.	.60-
Napkins, full crepe and emb'sed (12¼ lb. to M shts.) per ea.	.60-
Toilet, Bleached (M shts.) per ea.	5.85-
Toilet, Unbleached (M shts.) per ea.	4.25-
Towels—	*per case*
Bleached	3.20 to 3.75
Unbleached	2.60 to 3.05
Wrappings (Kraft)—	*per cwt.*
Extra Quality	6.00-
Super-Standard	5.25-
No. 1 Wrapping	5.00-
Standard Wrapping	4.75-
Standard Bag	4.37½-
Wrappings (Sulphite and Bleached Kraft)— (Rolls, f. o. b. mill)	
Bleached papers—	
M.F. & M.G. Waxing, 30 lb. (Carlands only)	*per cwt.* 7.35 to 7.50
(10,000 lbs.)	7.50 to 7.75
Drug wrapp. 35 lb.	7.00 to 7.25
Unbleached Papers—	
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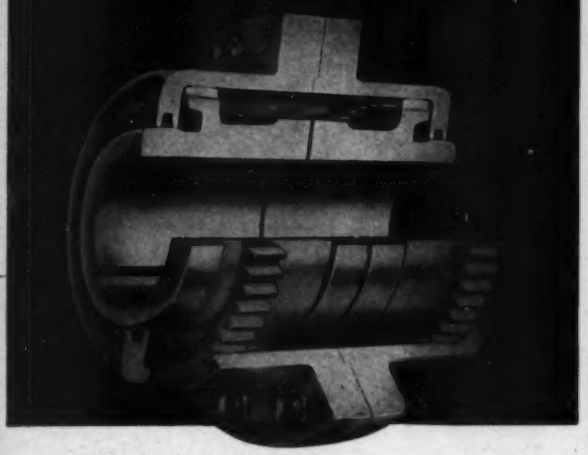

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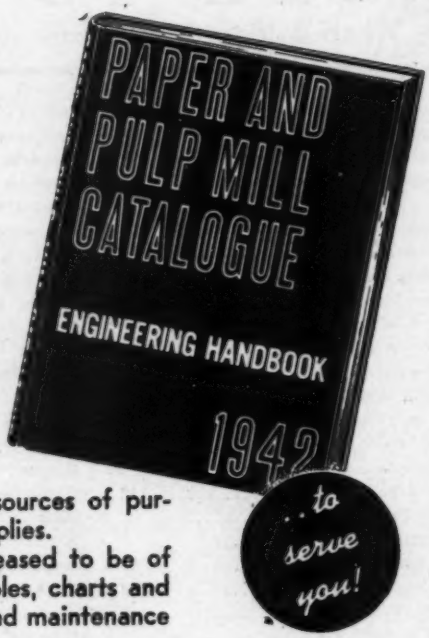

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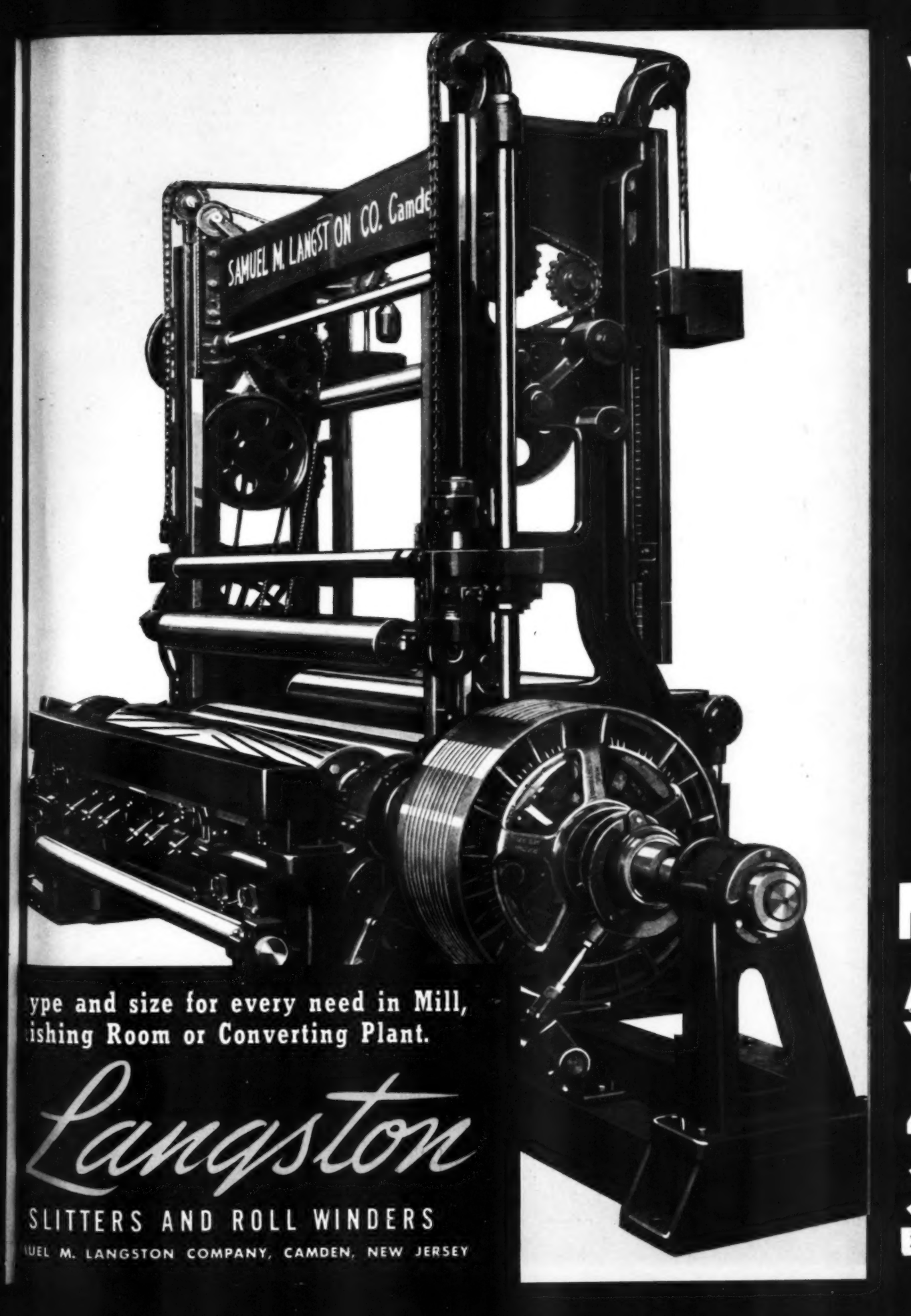

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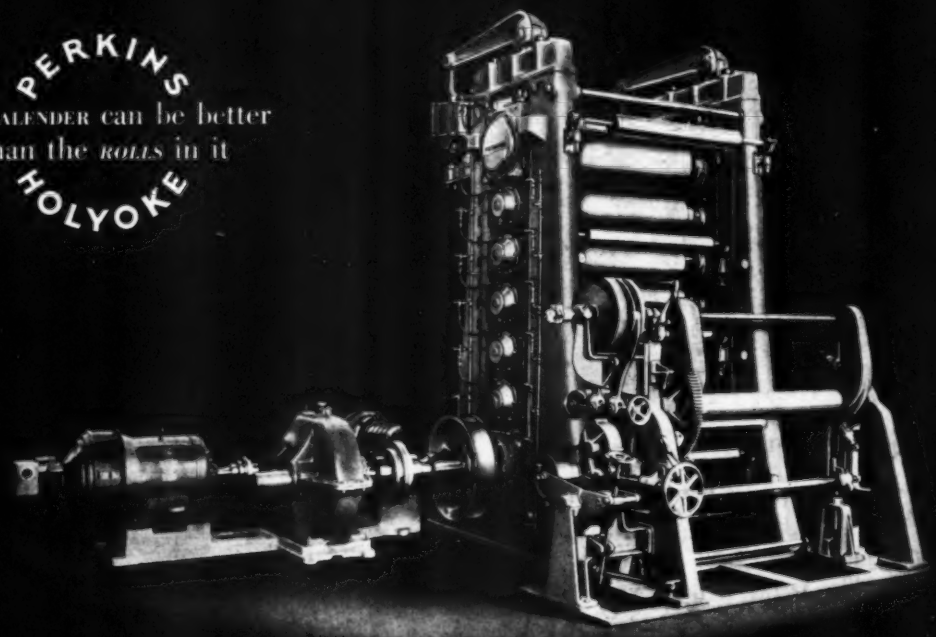

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